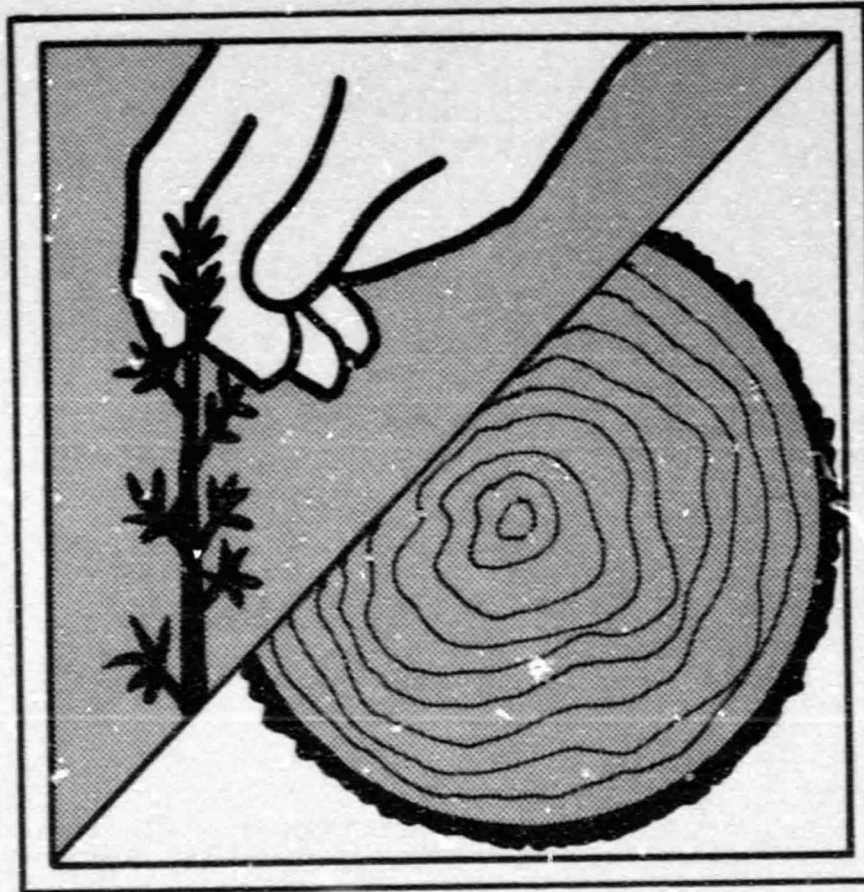


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NEW STATE FOREST PRACTICE LAWS



A REVIEW OF STATE PROGRAMS AND THEIR NATURAL RESOURCE DATA REQUIREMENTS

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TABLE OF CONTENTS

I.	INTRODUCTION.	1
II.	NATURAL RESOURCE DATA REQUIREMENTS OF FORESTRY PRACTICE PROGRAMS	13
	Forest Data Categories.	16
III.	STATE PROFILES.	19
	California.	21
	Idaho	27
	Maine	31
	Nevada.	35
	New Hampshire	37
	Oregon.	41
	Washington.	45
IV.	SUMMARY AND DISCUSSION.	49
V.	APPENDICES	55
	Appendix A - Digest of State Forest Practice Laws.	57
	Appendix B - Legislative Review of Administrative Regulation.	69
	Appendix C - State Landsat Applications and Natural Resource Information Systems	75
	BIBLIOGRAPHY.	83

PART I - INTRODUCTION

In recent years, natural resource programs involving public regulation of forestry practices prescribed by private owners of forest land have received substantial attention by the forestry community. This interest is a direct consequence of nationwide concern over maintaining and enhancing the quality of forest environments and their ability to produce a wide variety of forest products. According to Dr. Paul V. Ellefson, Associate Professor with the University of Minnesota, the 1972 amendments to the Federal Water Pollution Control Act (United States Statutes at Large, 1972) are among the many factors triggering interest in public regulation as a tool of forest policy.

At the state level, Dr. Ellefson notes that public regulation of private forest practices has resulted in the enactment of several state forest practice laws regulating private and, in some cases, public landowner activities. These laws attempt not only to protect natural environments, but also to ensure continuous productivity of forest lands, to maintain or enhance aesthetic values and to serve as an implementing mechanism to control water pollution.

To discuss forest practice regulations, one must begin with a rudimentary definition of forest practices. In Dr. Ellefson's report, "State Forest Practice Laws and Regulations: A Review and Case Study for Minnesota",* forest practices are defined from a timber management perspective as any activity or operation performed in the establishment, development, reproduction, care, or removal of forest trees. Examples of timber management practices include logging, site preparation, tree planting, stand thinning, application of fertilizers and chemicals, fire control measures, and construction of transportation networks. In a broader sense, forest practices may be any activity or operation which takes place within a forested area. Examples include silvicultural prescriptions for timber management purpose; removal of certain forest vegetation to enhance the forest's aesthetic characteristics; construction of hiking trails for forest recreational use; planting selected forest vegetation to improve wildlife habitat; and application of herbicides to foster improved forage production in forested areas. Many forest "products" can be affected by a given forest practice, including timber, water, fish and wildlife, recreation, aesthetics, and forage. Forest practices performed to produce one forest output may create either positive or negative effects on other forest outputs or for other landowners, now or in the future.

A state forest practice law can define regulatory programs to compel landowners to manage their forests in a desirable fashion. On the other hand, such programs may be enacted as piecemeal measures, such as separate regulatory laws to protect water quality. In either case, they address the same problems and would likely be treated in a similar manner.

* Ellefson, Paul V. and Cubbage, Frederick W., State Forest Practice Laws and Regulations: A Review and Case Study for Minnesota. Agricultural Experiment Station, Forest Series 32, University of Minn., St. Paul. 1980. This report summarizes forest practice laws enacted by states up to 1979.

Dr. Ellefson presents a number of persuasive arguments for employing public regulation as a program for guiding private forestry activities in his report:*

"Public regulation is often suggested as an effective means of curtailing the negative impacts on natural and human environments that may result when forest practices are poorly or inappropriately prescribed. Forest practice laws attempt to curtail practices that damage soil, water, air, and related resources. For example, the effect of forest practices on water quality is most commonly controlled by the recently enacted forest practice laws. Another major argument for regulation focuses on the need to insure forest land productivity for future generations. To do so is thought to require public laws which prevent needlessly destructive or consumptive uses of forests by present owners. Many forest practice laws attempt to guarantee productivity by setting regeneration and stocking standards for harvested forest lands. Regeneration standards have their historic basis in fears of timber famine and forest devastation. Such fears prompted most of the forest practice laws enacted from 1940 to 1950."

Since the early 1970's, several states have passed new state forest practice laws or revised old laws and regulations. Environmental issues have prompted this renewed interest in public regulation of private forest practices. The earlier focus on laws to prevent timber famine or forest devastation is now contrasted with laws dealing with concerns for water and air pollution, soil erosion, and herbicide and pesticide use.

Efforts to improve water quality have formed the cutting edge of the drive for regulation of private landowners' forestry activities. Concern stems in part from the more widespread and more intensive application of forest practices which can lead to water quality problems, e.g., pesticides, fertilizers, fire retardants, site preparation, and logging road construction. The 1972 amendments to the Federal Water Pollution Control Act (United States Statutes at Large, 1972) is Congress' effort to legislate a cure for water pollution in general. According to Dr. Ellefson, the law is one of the most complicated measures ever passed by Congress, containing a plethora of regulations, required administrative actions, and relatively inflexible guidelines.

The United States Environmental Protection Agency (EPA) perceives degradation of water quality carried by nonpoint sources to be a major obstacle to achieving the water quality goals stated in the amendments. To overcome this obstacle, the EPA plans to identify and enact, to the degree possible, the necessary legislation to enhance institutional arrangements to control water quality. In fact, the EPA argues that some type of regulatory program will be a necessary condition for achieving legislatively mandated water quality goals. The agency's aggressive efforts to implement the 1972 amendments have included suggestions for public regulation of private forestry activities via

* Id. p. 5.

a state forest practice law. Dr. Ellefson points out that it was a suggested state forest practice law released by the EPA in 1974 that spawned much of the current debate regarding forest practice regulation. He also states that the recently enacted 1977 Clean Water Act (United States Statutes at Large, 1977) provides a mid-course correction to the 1972 act and is likely to place even more importance on the role of state forest practice laws as a means of controlling nonpoint source pollution from forestry activities.

Section 208 of the 1972 amendments to the Federal Water Pollution Control Act provides the legal foundation for addressing problems of nonpoint source pollution. Most forestry activities fall under this section, with the exception of some point sources such as gravel crushing and log sorting. Section 208 requires governors to designate a state agency to develop areawide and statewide water quality management plans to control nonpoint source pollution.

While the 1972 Amendments to the Federal Water Pollution Control Act are fomenting much of the debate over state forest practice laws, Dr. Ellefson notes that it is not the only reason for forestry interest in such laws:*

"Other events prompted passage of the modern regulations in Oregon, Nevada, and New Hampshire. Regulations to prevent environmental damage and protect future productivity fostered these laws and contributed significantly to the goals of the state forest practice laws enacted in Washington, California, and Idaho. Conservationists looked to regulation as a means to improve forest practices on private lands and insure a more balanced use of forest lands. They wanted stringent laws at the state level with strict enforcement that would lead to good land stewardship and protection of present and future generations."

In response to increased calls for regulation of private forestry activities, forestry interests in several states drafted voluntary forest practice guidelines to improve private forest management activities. The guidelines concentrated on controlling nonpoint source pollution and ensuring adequate natural regeneration. The states with some form of voluntary guidelines, along with original dates of publication, authoring agency, and title are listed in TABLE I: VOLUNTARY FOREST PRACTICE GUIDELINES.

* Id. p. 7.

TABLE 1: VOLUNTARY FOREST PRACTICE PROGRAMS*

<u>State</u>	<u>Year</u>	<u>Author and Title</u>
Alabama	1977	Alabama Forestry Commission--Recommended Forest Management Guidelines to Control Non-Point Pollution from Silvicultural Practices
Kentucky	1978	Kentucky Department of Natural Resources and Environmental Protection, Divisions of Water Quality and Forestry--Kentucky Forest Practice Guidelines for Water Quality Management
Mississippi	1973	Mississippi Manufacturers Association and Mississippi Forestry Association--Forestry Practices in Mississippi: An Outline of Industry Guidelines
New York	1975	Empire State Forest Products Association and New York State Department of Environmental Conservation--Timber Harvesting Guidelines for New York
Oklahoma	1977	Oklahoma Select Forestry Committee Guidelines for Best Management Practices Concerning Forestry and Water Quality in Oklahoma
South Carolina	1976	South Carolina Forestry Association Voluntary Forest Practice Guidelines for South Carolina
West Virginia	1972	West Virginia Forest Practice Standards Committee--West Virginia Forest Practice Standards

* SOURCE: Ellefson, Paul V., and Cubbage, Frederick W. "State Forest Practice Laws and Regulations: A Review and Case Study for Minnesota": p. 8.

The guidelines describe methods of performing forest practices in order to minimize environmental damage. The Kentucky, Alabama, and Oklahoma guidelines cover nonpoint source pollution specifically. The recommended practices and means to control pollution are quite similar to those contained in state forest practice laws. The guidelines have received extensive publicity in their respective states. Their educational values are being promoted by both state natural resource agencies and private forest industries as being the best means to achieve environmental quality goals, including prevention of nonpoint source pollution.

Publicity given state forest practice laws has diminished somewhat, but these laws have not vanished as an important forestry issue. A number of forest practice laws were introduced into state legislatures from 1975 to the present without being passed. Many are still being considered. Impetus generated by states' Section 208 planning agencies may trigger a new round of forest practice legislation after submittal of water quality management plans. Forestry interests may push for state forest practice laws as a means of consolidating and localizing regulation. They may also welcome forest practice laws as insurance that the states will administer Section 208 planning, as opposed to Environmental Protection Agency administration in states deemed to have unsatisfactory Section 208 areawide and statewide water quality management plans. Much of the future of state forest practice laws will depend on the aggressiveness taken by the state water quality planning agencies in pursuing a regulatory approach to implement the 1972 amendments to the Federal Water Pollution Control Act and the 1977 Clean Water Act.

PROVISIONS OF STATE FOREST PRACTICE LAWS: Older Forest Practice Laws

Most pre-1969 forest practice laws approached regulation in a narrow sense, addressing only timber harvesting practices. Their stated purpose was primarily to ensure future productivity of forest lands and to prevent forest devastation. Usually the laws mandated that a specific number of desirable trees be left for regeneration purposes--consequently they were labeled "seed tree laws." Most older forest practice laws are still in effect. Some have been slightly modified, six have been strongly revised or superseded, and one has been repealed. Enacted in 1943, Minnesota's seed tree law was repealed in 1967 (Minnesota Laws, 1943). TABLE II: OLDER FOREST PRACTICE LAWS, lists states which still have older laws, the year in which those laws were passed, and the pertinent state statutes. Because many of the older laws are similar in content and intent, only the significant features of selected laws will be reviewed here.

Cutting regulations in older laws are minimal. Where they exist, they are designed to provide reasonably prompt establishment of at least a minimum stand of desirable tree species on the area being harvested. Most prescribe minimum cutting diameters or a minimum number of seed trees to be left per acre. Seed tree requirements are usually spelled out in detail, specifying the species size, number, and distribution of trees to be left, and the period for which the trees must remain uncut.

TABLE 11: OLDER FOREST PRACTICE LAWS*

<u>State</u>	<u>Year</u>	<u>Name and Statute</u>
Florida	1943	Seed Tree Law (Fla. Stat. Ann. secs. 591.27 to -.34)
Louisiana	1922	Turpentine Seed Tree Law (La. Rev. Stat. Ann. secs, 56:1493 & 56:1494)
Maryland	1943	Forest Conservancy Law (Ann. Code Md. Nat. Res. Art. secs. 5-388 to -400)
	1977	Pine Reforestation Law (Ann. Code Md. Nat. Res. Art. secs. 5-501 to -509)
Massachusetts	1943	Forest Cutting Practices (Ann. Laws Mass. ch. 132 secs. 40-46)
Mississippi	1944	Forest Harvesting Law (Miss. Code Ann. secs. 49-19-51 to 49-19-77)
Missouri	1945	State Forestry Act (Ann. Mo. Stat. secs. 254.010 to -.300)
New Mexico	1939	Act For Protection of Growing Timber (N.M. Stat. Ann. secs. 62-1-1 to -5 and 62-3-3 and -11)
New York	1946	New York Forest Practice Act (N.Y. Conserv. Law secs. 3-1101 to -1151)
Vermont	1945	Conservation and Management of Forest Land Law (Vt. Stat. Ann. tit. 10 secs. 2051 - 2055)
Virginia	1950	Seed Tree Law (Va. Code Ann. secs. 10-74.1 to -83.01)

* SOURCE: El'efson, Paul V., and Cubbage, Frederick W. "State Forest Practice Laws and Regulations: A Review and Case Study for Minnesota": p.9.

Maryland's 1943 Forest Conservancy District Law is potentially one of the strongest of the older laws that remains in effect. It allows district forest practice boards to construct forest practice guidelines which all landowners and operators must obey. The boards have, however, minimized their regulatory role and instead have favored an educational approach to guiding private forest practices. In addition to the 1943 law, in 1977 Maryland enacted a new Pine Tree Reforestation Law (Annotated Code of Maryland, 1977). The law is modeled after the 1950 Virginia Seed Tree Law. Like Virginia, the law provides significant penalties for noncompliance.

The 1943 Massachusetts law requires owners to notify the state forester before beginning timber harvesting operations. The state forester must then inspect the forest areas to be harvested and write a management plan for the landowners. Inadequate funding however, has prevented full implementation of the law.

Missouri possesses a voluntary forest tax law that affects only lands for which an application is made by the landowner and accepted by the Conservation Commission. After enrolling under the law, landowners must follow the forest practices recommended by the state cooperative forest management foresters. New Mexico regulates forest practices with a seed tree law and with slash disposal rules promulgated by the State Forestry Conservation Commission (New Mexico Statute Annotated, 1959).

Some of the strongest of the older forest practice laws have been amended or superseded by new laws. The states having such laws, the enactment date of their original legislation, and the former statutes are listed in TABLE III:

LAWS WHICH HAVE AMENDED OR SUPERSEDED OLDER FOREST PRACTICE LAWS.

**TABLE III: LAWS WHICH HAVE AMENDED OR
SUPERSEDED OLDER FOREST PRACTICE LAWS***

State	Year	Statute
California	1945	Cal. Pub. Res. Code secs. 4521-4618
Idaho	1937	Idaho Code secs. 38-301 to -312
Nevada	1903	Statutes of Nevada (1903) ch. 93
	1955	Nev. Rev. Stat. secs. 528.010 to .090
New Hampshire	1949	N.H. Rev. Stat. secs. 79:3, :10-:12, :19
Oregon	1941	Ore. Rev. Stat. secs. 527.610 to .990
Washington	1945	Wash. Rev. Code Ann. secs. 76.08.010 to .090

TABLE IV: NEW STATE FOREST PRACTICE LAWS*

State	Year	Name and Statute
Oregon	1971	Oregon Forest Practice Act (Ore. Rev. Stat. secs. 527.610 to -.990)
California	1973	Z'Berg-Nejedly Forest Practice Act (Cal. Pub. Res. code Div. 4, chap. 8, secs. 4511-4628, and Cal. Adm. Code tit. 14 subchap. 4.1 chap. 2 div. 2)
Washington	1974	Washington Forest Practice Act (Rev. Code Wash. Ann. secs. 76.09.010 to .935 and Wash. Adm. Code secs. 222-08 to -50)
Nevada	1971	Nevada Forest Practice Act (Nev. Rev. Stat. secs. 528.010 to -.090)
	1973	
Idaho	1974	Idaho Forest Practices Act (Idaho Code secs. 38-1301 to -1312)
New Hampshire	1971	Forest Conservation and Taxation; Pollution of Waters and Care of Timber Slash Law (N.H. Rev. Stat. secs. 79:3, :10 to :12, and :19 and secs. 149:8 and 149:19 and 224:44)
Maine	1969	Maine Land Use Regulation Law (Me. Rev. Stat. Ann. tit. 12 secs. 681-689)

* SOURCE: Ellefson, Paul V., and Cubbage, Frederick W. "State Forest Practice Laws and Regulations: A Review and Case Study for Minnesota": p.10.

Due to loopholes and unsound features, Idaho's 1937 Law was never enforced. Of the five remaining states listed, only the 1903 Nevada law and the 1949 New Hampshire law were relatively weak. In all the remaining laws, operators were required to register or to obtain permits to harvest. All six states authorized inspection of forest areas being harvested either during or after the harvest. Each state's law had moderately restrictive cutting practices guidelines to ensure future productivity. Both Oregon and Washington required a performance bond to guarantee restocking when operations were found in violation. If natural restocking did not occur within five years, the bond was forfeited and the proceeds were to be used to replant the area. In Washington, forest lands cleared under agricultural permits were inspected after five years. If the area was not in agricultural use, the area could be reforested by the state forester. The cost of doing so constituted a lien against the property.

PROVISIONS OF STATE FOREST PRACTICE LAWS: Newer Forest Practice Laws

The purpose of this report is to carefully review the natural resource data requirements and provisions of new regulatory forest practice laws enacted by states through 1980. Since 1969, seven states have substantially revised or replaced their old forest practice laws. PART III: STATE PROFILES and PART IV: SUMMARY AND DISCUSSION provide an update and revision of Dr. Ellefson's review of these laws in his report: "State Forest Practice Laws: A Review and Case Study for Minnesota". The states, the year their laws were enacted or revised, and the relevant statutes are listed in TABLE IV: NEW FOREST PRACTICE LAWS. The Natural Resource Data Requirements of Forestry Practice Programs are presented in PART II.

A complete digest of state laws regulating forest practices is attached as Appendix A*. Also included is a summary of legislation which provides for legislative review of administrative regulations (Appendix B); and a summary of Landsat applications and/or information systems that have contributed to meeting the natural resource data requirements of their respective state forest practice legislation (Appendix C).

* SOURCE: Ellefson, Paul V., and Cubbage, Frederick W. "State Forest Practice laws and regulations: A Review and Case Study for Minnesota": p. 32-41.

PART II

NATURAL RESOURCE DATA REQUIREMENTS OF FORESTRY PRACTICE PROGRAMS

INTRODUCTION

Forestry Practice Law regulations require state forestry agencies to collect data relative to forest conditions. A complete list of those data requirements extracted from state forestry practice laws is provided in this section. An explanation of each data category is included. The primary areas requiring data collection within the state programs are:

- Permit issuance
- Compliance with forest harvesting standards
- Reforestation plans
- Compliance with Section 208 of the 1972 amendments to the Federal Water Pollution Control Act

The States of California, Idaho, Oregon and Washington have used or tested information gathered by Landsat and other remote sensing techniques to fulfill their statutory or administrative responsibility in meeting natural resource data requirements of their forestry practice programs. Aerial photography, Landsat data, soil surveys, ground surveys and biological data can all be stored in a state natural resource information system and retrieved when information relevant to a specific geographic area is needed. Appendix C provides a review of natural resource information systems and/or Landsat application programs for the states of California, Idaho, Oregon and Washington. Vermont's Forest Resource Assessment Program and Virginia's Resource Information System are also reviewed in Appendix C.

Federal and state-level agencies, as well as commercial timber companies, are finding Landsat to be an efficient data source for forest management. To effectively manage commercial timberlands, detailed inventories are essential. With Landsat, very large forest areas can be completely mapped. Broad classes of timber resources such as deciduous, coniferous, mixed stands and some timber density levels can easily be detected. This level of detail is often sufficient for the forest manager's needs. If the Landsat analysis identifies areas of disease or other stress conditions, the forest manager can then acquire small amounts of low altitude photography for closer inspection.

Monitoring timber harvest and measuring the extent of clear cutting are also appropriate applications. Landsat's repetitive coverage provides a means for monitoring the changes brought about by timber cutting, road building and fire. In Oregon, for example, Landsat revealed for the first time the extent of clear cutting in the remote timber areas.

Potential applications of Landsat or other future remote sensing satellites that could be used to meet data requirements of forest practice programs include:

- Land Use/Land Cover Mapping
- Change Detection
- Detecting Water Pollution Sources
- Locating and Mapping Surface Water Bodies
- Detecting Coastal Land Use Change
- Rangeland Management
- Timber Inventories
- Forest Harvest Monitoring
- Forest Disease and Stress Detection
- Wildlife Habitat Analysis
- Studying Man's Impact on the Land

The following section provides a list of data requirement categories extracted from state forestry practice legislation. In addition to requiring data collection to help support forestry programs dedicated to ensure forest productivity and maintain and enhance aesthetic values, forest practice laws serve as an implementing mechanism to control water pollution. Nonpoint pollution sources generated from forest harvesting activities may be detected by Landsat. Overall, the data requirements described below were found to be consistent throughout all the forestry practice laws reviewed in this report.

FOREST DATA CATEGORIES

Forest

Forest data is necessary to ensure the protection, productivity and enhancement of aesthetic values of forest resources and for the control of water pollution from forest harvest activities. The following activities need to be conducted:

- inventory species present
- monitor harvest operations
- monitor reforestation and revegetation
- monitor forest land conversion to non-forest uses
- monitor fire prevention effects and results

Although forest land conversion is permitted, this activity encroaches on natural wildlife areas. Current maps are therefore required to monitor existing natural habitats to ensure more comprehensive management and protection of wildlife. The impact of the conversion will depend on the new land use (i.e. pasture, urban, cropland).

Soil

Soils data are necessary to develop practices to minimize erosion damage, enhance forest productivity and locate plantable areas on forest soils. The following information is needed:

- soil productivity
- character - type, depth, slope
- soil stabilization factor
- erosion potential

Fish and Wildlife Habitat

For the preservation of fish and wildlife populations, information on the location, condition, types of species, migration patterns and foraging habits is required. Current and unique habitats should be studied. Endangered species should be monitored and reproduction areas for all species should be located. Life histories of native american wildlife could provide much of the biological data, while remote sensing techniques could be used to locate existing and prime habitat locations. Remote sensing data could also provide necessary vegetation data needed for forage studies.

Water/Hydrology

State regulations require forest harvest operations to be planned and conducted so as to minimize any adverse changes in the hydrologic balance. Information required should include:

- changes in water quality and quantity
- location of surface water drainage channels
- extent of water pollution
- stream channel diversions
- flood plains
- watersheds
- stream temperature (as affected by shade removal)
- location of water bodies
- identification of nonpoint sources entering forest waters (i.e. pesticides, fire retardants, forest product wastes)
- wet areas and waterways (physical and biological data)
- natural drainage
- coastal areas

Air

To maintain air quality standards, it is necessary to obtain air quality data, particularly the amount of suspended particulates and methods of fugitive dust control. Establishment of an air pollution monitoring and control facility where data will be collected and analyzed could monitor the effect of air pollution from urban activities on adjacent forests productivity.

Topography

A main objective of forest practice regulation is to minimize damage and restore land to its original contour, for which topography and contour maps will be needed. Slope information is needed to locate natural erosion barriers and help determine revegetation and reforestation areas. Surface features, water bodies adjacent to operating areas, existing and proposed roads, and forest location (i.e. mountain, urban, desert) need to be identified.

Land Use

In order to restore, enhance and plan uses adjacent to forest land, land use maps and information are necessary to determine prime forest land, prime agricultural land, plains, desert areas, wildlife and range habitat, urban areas, private, state and federal forest uses and forest land conversion operations. The location and activities of mineral explorations, rock quarries, gravel pits, borrow pits and spoil disposal areas not covered by the Surface Mine Reclamation Act of 1971 also need to be identified.

Geology

Geology data with respect to forest practices are necessary to impose special conditions on reforestation harvesting techniques, and to prevent damage caused by slides and erosion.

Insects, Pests, Disease

Data on insect, pest and diseases and the extent of damage caused to forest lands is an important requirement of forest management activities. The use of remotely sensed data has proved to be an acceptable method to determine the extent of damage and identify critical areas in need of control operations.

Vegetation

In addition to the aforementioned role of vegetation as forage for wildlife, additional data are needed to develop practices for stabilizing soils and providing shade: and to manage protected species, revegetation and reforestation species, forest productivity, fish and wildlife habitat and natural vegetation where a forest harvest plan is unnecessary before cutting begins (i.e. Christmas tree, cacti, yucca, and other small operations). Data are also needed on species of trees, shrubs and plants used for wind breaks, woodlots, soil erosion control, noise abatement, fire control and beautification purposes.

Climatology

Climatological information is needed to assist in all phases of reforestation and revegetation. Necessary information includes average seasonal precipitation, wind information and seasonal temperatures.

Historic Areas/Archaelolgic Sites

The historic and current status of forested areas is of great interest to forest managers. Land resource data needs to be collected to identify those areas worthy of protection. This information can be provided through land use mapping and to some extent, low altitude aerial photography.

PART III
STATE PROFILES

CALIFORNIA

TITLE: Z'berg-Nejedly Forest Practice Act of 1973
Calif. Public Resource Code Division 4, Chap. 8,
Sec. 4511 - 4628. Calif. Admin. Code Title 14, Sub-
Chap. 4.1, Chap. 2, Div. 2 (rules and regulations)

LEAD AGENCY: California Department of Forestry - The Resource Agency

STATE CONTACT: Loyd Forrest, Deputy Director
Department of Forestry
Resources Building
1416 9th Street
Sacramento, California 95818
916/445-0179

CALIFORNIA FOREST PRACTICES PROGRAM

Introduction

From 1945 to 1971, California operated under the California Forest Practice Act of 1945. Numerous amendments and rule revisions had greatly expanded the scope of the 1945 act. In general, the law was well enforced. Despite constant modernization and increasing enforcement of the law, it had many detractors. As a result, a 1971 court decision declared important provisions of the 1945 act to be unconstitutional. One of the court's major findings was that authority to develop forest practice rules for State Board of Forestry approval and adoption had been unlawfully delegated to local committees dominated by timber owners and operators. As a replacement, the California legislature enacted the Z'berg-Nejedly Forest Practice Act of 1973. The new law actually took effect in November 1974, when forest practice rules were adopted. Consequently, the state operated with temporary forest practice rules from 1972 until 1974.

Significant improvements have been made in both the regulatory process and timber operations since January 1, 1974, when the Z'berg-Nejedly Forest Practice Act became law. The State Board of Forestry has the statutory authority under the Act to adopt and modify rules and regulations. Implementation of the program rests with the Director of Forestry. Numerous amendments and emergency actions have been required by subsequent interpretations of the 1973 Forest Practice Act and other California laws. The most significant amendment to the 1973 California law was enacted in 1977 after three years of controversy. A 1975 court ruling found that the California Forest Practice Act did not exempt timber harvesting operations from the provisions of the Environmental Quality Act, including the necessity of preparing environmental impact reports. Emergency administrative measures were taken to make timber harvesting plans a functional equivalent to environmental impact reports. This action has since received legislative approval.

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The California law is the strictest and most far-reaching forest practice law to date. It was enacted during the peak of the environmental movement in a state with many active conservation groups. Despite being the most stringent and comprehensive law passed at the time, the State Fish and Game Department, Regional Water Quality Control Boards, Sierra Club Planning and Conservation League, and others have charged that the forest practice standards are not adequate to protect fish and wildlife habitat and water resources. (During the period concern was being expressed about the adequacy of water quality protection in the existing forest practice rules, the State Board of Forestry was preparing a "208" water quality report in compliance with the 1972 Federal Water Control Act. The Board of Forestry has since submitted its "208" report to the Water Resources Control Board.) Some have argued that the law and subsequent administrative and court interpretations impose unjustifiable procedural and financial penalties on timber harvesting. In addition to complying with the extensive rules and regulations adopted by the State Board of Forestry, timber operators have had to abide by a number of administrative interpretations of policy and objectives set forth in the law. This contention led the state legislature to limit the Director of the Department of Forestry to only the Board's rules when reviewing timber harvesting plans for approval or disapproval. Subsequent regulations have clarified the role of the Director in reviewing and approving timber harvest plans.

The California Department of Forestry is of the opinion that the forest practice law is meeting the intended goals of providing environmental protection while encouraging sustained production of timber products. The Department processed 2,231 timber harvesting plans in 1976 and made a total of 9,380 inspections that year. Although 2,460 separate rules were violated, the statewide compliance rate with all the applicable regulations was 96 percent. The Department has had to take fewer legal actions each year since 1976 to enforce the regulations, and the compliance rate has increased to 97 percent.

Title, Purpose, and Outputs Addressed

The L'berg-Nejedly Forest Practice Act of 1973 states that the forest resources and timberlands of the state furnish high quality timber, recreational opportunities, and aesthetic enjoyment while providing watershed protection and maintaining fisheries and wildlife. The law declares that:

" it is the policy of [the] state to encourage prudent and responsible forest resource management calculated to serve the public's need for timber and other forest products, while giving consideration to the public's need for watershed protection, fisheries and wildlife, and recreational opportunities alike in this and future generations."

The law intends to protect a number of forest resources or outputs including the previously mentioned high quality timber products, recreation, watershed, wildlife, fisheries, and aesthetic values as well as range and forage resources. Despite its broad policy statement and intent, the present forest practice rules focus almost exclusively on regulating timber harvesting activities. Other forest management and forest based practices that affect forest outputs are not controlled by the law at this time. The Board's 208 Report to the Environmental Protection Agency provides for a regulatory program covering other forest management activities. These should be enacted by the Legislature by the end of 1982.

Method of Establishing Forestry Standards

The California law is a combination of enabling legislation and legislation specifying minimum forest practice standards. A nine-member State Board of Forestry has authority to adopt forest practice rules and regulations for each district. These rules must meet or exceed stocking standards stated in the law. The Board is mandated to determine, establish and maintain an adequate forest policy for the state. In this role it formulates policies for the guidance of the Department of Forestry, represents the state's interest in the acquisition and management of the state forests, and annually determines the need for forest management research and recommends projects to the legislature. In response to the 1971 court ruling, the new board has members representing the general public, the forest products industry and the livestock industry.

The State Board of Forestry divided the state into three forest practice districts based on climate, soil type, principal forest practices and other relevant factors. Each district has a nine-member district technical advisory committee charged with advising the board about district rules governing timber operations. Assistance and recommendations from the Department of Fish and Game, State Water Resources Control Board, California Regional Water Quality Boards, State Air Resources Board, and local Air Pollution Control Districts were required in drafting the rules. The Lake Tahoe Regional Planning Agency and the counties of the state have the right to adopt rules and regulations which are stronger than those promulgated by the Board. Three local governmental units have exercised their rights.

Responsible Agency and Method of Administration

The law is administered by the Director of the California Department of Forestry. Proposed timber harvesting operations require submission of a timber harvesting plan which must include the name and address of the owner and operator, a description of the land, a description of the silvicultural methods to be used, methods to avoid soil erosion, special provisions to protect unique areas during timber operations, and any other information the board might require. Timber harvesting plans must be prepared by registered foresters licensed by the Board of Forestry. The Director of Forestry has delegated to the Region Chiefs the responsibilities for reviewing timber harvesting plans and maintaining custody of the official records. Timber harvest plans must be submitted to the Department. The Department has up to five days to determine if the plan is accurate, complete and in proper order. If the plan meets these requirements, it is filed. If it fails, it is returned for correction.

The Director of the Department must determine if an area scheduled for harvest is in need of a pre-harvest inspection. If such is deemed to be the case, the inspection must occur within 10 days of filing of the timber harvesting plan which has been prepared for the area. The Director has 15 days after a plan is filed or 15 days after a pre-harvest inspection, to determine if the plan conforms to the rules established by the Board. A plan review system has been established by the Director which allows other interested agencies (Fish and Game, Water Quality and Parks and Recreation) and the public the opportunity to comment on the plan. However, the Director has final authority over the approval of a plan. If a plan is denied by the Director, the submitter may appeal to the Board. If the Director does not respond within this or a mutu-

ally agreed to period of time, the plan becomes effective automatically and operations may commence. The Director must inspect operations at the beginning of harvest operations, after operations are well underway, and upon completion of operations. A stocking report must be submitted within five years after harvesting, at which time the Director must reinspect the area to ensure compliance with minimum stocking standards. The Director may also inspect at any other time considered necessary for enforcement of the law.

Applicability and Exemptions

The law applies to all nonfederal public and private forest lands. Constructing or maintaining rights-of-way, Christmas tree culture, fuelwood cutting, removal of dead, dying, or diseased trees and timber operations on timberlands designated as experimental forest lands are exempt from some requirements of the law. Private timberland owners must apply for a permit to convert timberland to nontimber uses when such land lies within a timberland preserve zone. Those applications can only be approved if the Director makes written findings that:

- the conversion would be in the public interest;
- the conversion would not have an adverse effect on timber-growing or open space land; and
- the soils, slopes, and watershed conditions would be suitable for the proposed converted use.

Timber/harvesting plans for publically owned timberlands are subject to the environmental review procedures of the California Environmental Quality Act and must be submitted to its Director with an Environmental Impact Report. Negative Declarations must be cleared through the State Clearinghouse.

Violations and Penalties

Any person who violates provisions of the law or rules established by the Board can be charged with a misdemeanor. Violations are punishable by fines up to \$500 or imprisonment in county jail for up to six months, or both.

No person can engage in timber operations until a timber operator license has been obtained from the Director of the Department of Forestry. To engage in timber operations without a license is a misdemeanor. A timber operator license may be suspended or revoked for violations of rules established by the Board.

If a timber operator violates or threatens to violate any provisions of the rules and regulations, the Department of Forestry may initiate court action to issue a temporary restraining order or order the operator to take appropriate corrective action. The court may also authorize the Department to incur expenses to take corrective action. Any expenses incurred by the Department constitute a lien on the landowner's property unless paid for by the timber operator or owner. If the timber operator does not comply with a restraining order, he may be ordered to stop all work on the operation. He may also be prohibited from performing any harvesting operations in the state.

Forest Practice Rules

Rules and regulations for each of the three forest districts are structured in a similar manner. The most common rules are contained primarily in Articles 3 through 9 of each set of rules. Article 3 regulates silvicultural methods which may be used and sets minimum stocking levels that must be met after harvest or thinning. Areas harvested must contain an average point count of at least 300 per acre, calculated as follows: 1) each countable tree not more than 4 inches diameter at breast height (d.b.h.) to count as 1; 2) each countable tree between 4 and 12 inches d.b.h. to count as 3; and 3) each countable tree over 12 inches d.b.h. to count as 6. Or, the area may have an average residual basal area of stems greater than 1 inch d.b.h. of at least 85 square feet per acre on site class I lands or 50 square feet per acre on site class II or lower lands. Or, for redwood root crown sprouts, one sprout for each foot of stump diameter may be counted up to a maximum of six per stump. Restocking must occur within 5 years of harvest.

Article 3 contains additional rules and regulations which may be required in addition to or as a substitute for the above minimum requirements. The rules vary slightly in each of the three districts in the state. Silvicultural and harvesting methods addressed in the rules include commercial thinning, shelterwood, seed tree, clear cutting, and sanitation and salvage cuts.

Article 4 requires protection of water quality, maintenance of soil productivity, protection of young seedlings and residual trees. Water protection controls must include rules for the following activities:

- disposal of petroleum products, sanitary wastes, and refuse which may enter streams or other waters;
- construction of logging roads and skid trails across streams which may substantially impair water flow and the free passage of fish;
- activities which have potential to damage unmerchantable streamside vegetation, especially hardwood trees;
- activities which have potential to damage streambeds or banks. Such activities include skidding or hauling logs through, across, or into streams; operating tractors or other heavy equipment near streambeds; or constructing log landings or log roads in or near stream channels; and
- activities leading to slash, debris, cuts, fills, and side cast earth.

Article 4 also requires careful filling practices, tractor-yarding, cable yarding, landing selection, debris disposal, and logging equipment service.

Article 5: Erosion Control, regulates logging roads, road drainage, tractor roads, landing locations, and waterbreaks. The severity of regulation of practices depends on the soil erosion class of the soils in the harvest area. The classes are appended to the regulations.

Article 6: Stream and Lake Protection, sets standards for timber operations, stream crossings and harvests in designated stream and lake protection zones; and standards for operating equipment in or near streams, exclusion of debris from streams, and harvests in wet areas or meadows.

Article 7: Hazard Reduction, regulates snag disposal and retention, slash burning, and protecting residual trees during slash burning.

Article 8: Fire Protection, requires timber operators to file yearly fire plans, keep roads passable, post fire rules, warn employees to obey rules regarding lunch and warming fires, watch welding fires, prohibit uncovered glass containers, and clear areas around cable blocks.

Article 9 requires that timber operations be conducted to minimize a build-up of forest insects and diseases, and requires that any such break-outs be reported to the Department of Forestry.

Early in 1979, the Department established special review procedures for timber harvesting plans within wild and scenic river watersheds. Until the legislature adopts management plans for wild and scenic rivers, the Department has taken steps to protect the scenic qualities of these areas.

IDAHO

TITLE: Forest Practice Act of 1974
Idaho Code Sec. 38-1301 -- 38-1312

LEAD AGENCY: State Board of Land Commissioners

STATE CONTACT: Jack Gilette, Assistant Director
Idaho Department of Lands
State House, Room 121
Boise, Idaho 83720
208/334-3280

IDAHO FOREST PRACTICES PROGRAM

Introduction

The Idaho Forest Practice Act of 1974 became operational in March, 1976, after rules and regulations required by the law were approved by the state legislature. The Idaho law is modeled after the Oregon Forest Practice Act. Administration and enforcement is assigned to the State Board of Land Commissioners, which in turn relies on the Director of the Department of Lands to conduct field administration and enforcement.

The law governs operations on both state and private forest lands. It requires all timber operators to notify the Department of Lands before beginning a forest practice. The law has been very effective. Of the 2700 forest operations that occurred on Idaho's private forest lands in 1979, only 28 percent were found to be unsatisfactory in compliance with rules and regulations and one percent failed to comply with the law and were issued violations.

Legislative Policy

It is the policy of the State of Idaho to encourage forest practices on public and private lands that maintain and enhance social and economic benefits as well as soil, air, and water resources and providing habitat for wildlife and aquatic life. The Act intends to assure continuous growing and harvesting of forest tree species while providing the above benefits. Under the law, timber supplies are to be protected.

Method of Establishing Practices

The law directs the Idaho Board of Land Commissioners to adopt minimum standards for the conduct of forest practices in the state. The rules adopted for forest regions establishing these minimum standards must:

- (a) provide for the harvesting of forest tree species in a manner that will maintain the productivity of the forest land, minimize soil and debris entering streams and protect wildlife and fish habitat;

- (b) provide for road construction that will ensure protection and maintenance of forest productivity, water quality and fish and wildlife habitat;
- (c) provide for reforestation that will maintain a continuous growing and harvesting of forest tree species by describing the reforestation conditions, specifying the maximum number of trees per acre and the maximum period of time allowed after harvesting for establishment of forest tree species, and requiring stabilization of soils which have become exposed as a result of harvesting;
- (d) provide for the use of chemicals or fertilizers so public health and aquatic and wildlife habitat will not be endangered; and
- (e) provide for management of slashings resulting from the harvesting, management or improvement of forest tree species. The intent is to protect reproduction and residual stands; reduce risk from fire, insects and disease; optimize the conditions for further regeneration of forest tree species; and maintain air and water quality and fish and wildlife habitat.

The Idaho Department of Lands is directed to appoint a seven-member forest practices advisory committee to provide technical assistance and recommend rules and regulations to the Board for the Department's administration and enforcement of the Act.

Method of Administration

The Idaho Forest Practice Act, administered by the Director of the Idaho Department of Lands, requires the operator, timber owner, or landowner to notify the Department before forest operations can begin. The Department is directed to achieve coordination and cooperation with other state agencies in administering the law. The Department must also provide management assistance to private landowners and timber operators.

Notification is required for timber harvesting, road construction, reforestation, application of fertilizers and chemicals, and pre-commercial thinning.

Applicability and Exemptions

The law applies to all nonfederal, public land in the state. State-prepared or alternate management plans are acceptable in lieu of compliance with the rules and regulations. Conversion of forest land to other uses is allowed.

Forest practices conducted in accordance with the provisions of a woodlot management plan approved by the woodlot foresters of the Department of Lands are exempt from the provisions of this Act. Similar woodlot, farm or ranch plans approved by the board of supervisors of a soil conservation district are also exempt.

Notification is not required for routine road maintenance, recreational use, grazing, Christmas tree culture, or harvesting of minor forest products. Ownership of less than 10 acres is exempt from regeneration and stocking rules.

Violations and Penalties

When violations occur, the Department of Lands must send a notice of violation to the timber operator ordering the operator to cease violation. If a stop

work order is not complied with, violations are considered a misdemeanor punishable by a fine of up to \$300, a jail term of up to six months, or both. The punitive emphasis of the enforcement procedure is on requiring the operator to perform corrective repairs or pay for the restoration and repair work to be done by the Department.

Forest Practice Rules and Regulations

Timber harvesting rules require that trees of sufficient vigor and of acceptable species must be left after harvest to provide for continuous growth and harvest. Soils must be protected by proper skid trail location, landing size, and cable yarding techniques. Landing, skid trail, and fire trail location must be properly planned. Drainage systems must control the dispersal of runoff waters from exposed surfaces. Waste materials must not enter streams. Streams must be protected by avoiding skidding in or through them, avoiding cable yarding through them, and providing vegetation to shade the water, stabilize the soil, and act as a filter at the edge of the stream. Consideration should be given to aesthetics, wildlife and aquatic habitat, wildlife escape cover, and fruit sites.

Road construction rules regulate landings, road specifications and plans, road construction, and road maintenance. Reforestation rules require restocking to at least the following minimum levels:

- (a) from 150 trees per acre with an average diameter at breast height (d.b.h.) of 2.9 inches or less down to 20 trees per acre, with an average d.b.h. of 11 inches or greater for ponderosa pine type forests; or
- (b) from 200 trees per acre with an average d.b.h. of 2.9 inches or less down to 20 trees per acre, with an average d.b.h. of 11 inches or greater for mixed type forests.
- (c) intermediate stocking levels vary on a sliding scale depending on average d.b.h. Countable trees must be of an acceptable species. Seeding or planting may be required if satisfactory natural regeneration does not occur within three years.

Chemical equipment and containers must be kept in leakproof condition, and chemicals must not be mixed near streams. Aerial and ground applications of chemicals must leave filter strips next to bodies of water, containers must be properly disposed of, daily records of applications must be kept, and spills must be reported immediately.

MAINE

TITLE: Maine Land Use Regulation Law of 1969
(as amended and revised, effective 1971)
Maine RSA Title 12 Secs. 681-689

Mandatory Shoreline Zoning Law of 1971
Maine RSA Title 12 Secs. 4811-4814

Maine Slash Law
Certain Deposits and Discharges Prohibited
Maine RSA Title 38 Sec. 417

LEAD AGENCY: Land Use Regulation Law administered through
Land Use Regulation Commission
Mandatory Shoreland Zoning Law administered
through Maine State Planning Agency
Certain Deposits and Discharges Prohibited
administered through Department of Environmental
Protection

STATE CONTACT: Jeffrey Pidot, Director
Land Use Regulation Commission
State House Station 22
Augusta, Maine 04233
207/289-2791

Richard Rothe, State Shoreland Zoning Coordinator
Maine State Planning Office
State House Station 38
Augusta, Maine 04223
207/289-3261

Steven W. Groves, Director
Water Quality Control Division
Department of Environmental Protection
State House Station 17
Augusta, Maine 04233
207/289-2591

MAINE'S FOREST PRACTICES PROGRAM

Introduction

Like New Hampshire, Maine does not possess a comprehensive forest practice law, but does regulate forest practice activities in some land use districts, protection areas, along streams and along shorelands. The Land Use Regulation Law regulates forestry activities in unincorporated areas of the state. Statewide zoning rules require notification on certain classes of land throughout unorganized areas of the state. These areas are zoned as protected areas. Depending on the zoning class, landowners may ignore forest practice

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standards or must notify the Commission before the start of operations. They must comply with standards made by the Maine Land Use Regulation Commission (LURC) or must apply to the Commission for a permit to conduct operations. The standards for timber harvesting regulate activities in shorelands only. In addition to compliance with standards, permits are required in development areas, high elevations, steep slopes, and activities near trails and streams. In fish and wildlife protection zones, agreements must be reached before harvesting activities can begin. A Roadside Cutting Law that attempted to limit clear cutting along major public roads has been repealed.

Slash disposal regulations are administered through the Department of Environmental Protection (DEP). These regulations apply statewide. The Slash Law is similar to the Land Use Regulation Law in its regulations and enforcement authority towards prohibiting slash in streams. A joint enforcement effort between the DEP and LURC is usually administered when a slash violation occurs.

The Shoreland Zoning Law regulates forest practices in all state shoreland areas. Regulations and forest practice standards are similar to the Land Use Regulation Law's but are less stringent. No notification to conduct a forest activity is required.

MAINE'S LAND USE REGULATION LAW

Legislative Policy

The purpose of the Land Use Regulation Law is to prescribe standards for the use of air, land, and water in the State of Maine. The Land Use Regulation Commission, acting on principles of sound land use planning and development, will prepare these standards which are required to protect public health, protect natural, scenic and historic features, and reflect a consideration of the availability and capability of the natural resource base. A similar policy is stated in the Mandatory Shoreland Zoning Law and the Slash Law.

Method of Establishing Practices

Practices are prescribed by the Maine Land Use Regulation Commission. The Commission classifies various land use districts and subdistricts according to their geographic, social, biological, and economic uses. Official land use maps designate that all parts of the unincorporated areas of the state fall into one of the land use districts decreed by the Commission. Degree of restriction on practices depends on which land use district the activity takes place within. Forest practices are regulated in protection and development zones to protect water quality, scenic values, and wildlife habitat.

Applicability and Exemptions

The Land Use Regulation Law applies to all timber owners and operators. Single family residences, farm operations, maintenance activities, utility facilities, relocations within public rights-of-way and timber harvesting and road building within management districts in unorganized areas are among the activities exempt from the Land Use Regulation Law. Road construction activities are exempt from regulations in management zones if they are not included in the definition of forest practice activities. Additional activities are exempt depending on which land use subdistrict the activity takes place within.

Violations and Penalties

The Land Use Regulation Commission has the power to issue stop work orders or orders to take corrective action.

Fines for violations of the standards or failure to obtain a permit may be up to \$500, with each day being a separate violation.

Forest Practice Rules

Areas within 250 feet of a body of water cannot have harvest-created openings greater than 14,000 square feet, or harvests removing more than 40 percent of the volume of trees 6 inches d.b.h. or greater, or slash left within 50 feet of water. Soil disturbance must be minimized and filter strips must be left. These standards apply to major shoreland zones which are along bodies of water greater than 10 acres in size or along streams draining 50 or more square miles. Regulations require shade areas to be maintained around smaller bodies of water.

Construction of land management roads and minor water crossings requires notice to the Commission and performance with applicable standards. Roads must be located, constructed, and maintained to minimize erosion. Road crossing of streams must be minimized, bridges and culverts of adequate size, cuts and fills constructed properly and revegetated, and culvert bottoms should be flush with or below streambed bottoms.

NEVADA

TITLE: Nevada Forest Practice Act of 1955. Amended 1971, 1973.
Nevada Revised Statutes Sections 528.010 - 528.090

LEAD AGENCY: Department of Conservation and Natural Resources -
Division of Forestry

STATE CONTACT: Pat Murphy, Assistant State Forester
Nevada Division of Forestry
201 Fall Street
Carson City, Nevada 89710
702/885-4350

NEVADA FOREST PRACTICES PROGRAM

The Nevada Forest Practice Act of 1955 established the basic framework for regulation of forest practices in the state. The law received major revision in 1971 and was amended in 1973 to include water quality problems. The purpose of the new law is to establish minimum standards of forest practice, to promote sustained productivity of the forests of the Sierra Nevada, and to preserve the natural water supply of the state. The law is used extensively, especially in the Lake Tahoe area, where it has been effective in preventing the clearing of forest lands for nonforest uses.

Outputs Designed to Protect

Primary outputs protected are timber supplies, water, and soils.

Method of Establishing Practices

Some practices are established in the basic act, specifically cutting practices, erosion controls, activities near water, seed tree requirements, and fire prevention and suppression measures.

The seven member State Board of Forestry and Fire Control is delegated the authority to promulgate rules to protect residual trees from damage during logging and any other rules necessary to carry out the forest practices act.

Method of Administration

The Nevada law is administered by the State Forester Firewarden. Before harvesting, landowners must submit a timber harvesting plan which is to be accompanied by an application for a logging permit. A performance bond based on the contract value of the timber to be cut and conditioned on compliance with all the provisions of the logging permit must be posted. Inspections of the harvest area are made by the state forester before and after harvest.

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Applicability and Exemptions

The law applies to all nonfederal public and to all private forest landowners. Conversion also requires a permit.

The Committee composed of the state forester firewarden, the director of the department of wildlife and the state engineer, may grant a variance authorizing any prohibited activity if it is determined that the goals of conserving forest resources and achieving forest regeneration, preserving watersheds, reaching or maintaining water quality standards, continuing water flows, preserving fishlife and stream habitat and preventing soil erosion will not be compromised.

Violations and Penalties

A violation is a misdemeanor punishable by imprisonment for not more than six months or fines ranging from \$10 to \$500, or both.

Forest Practice Rules

The law regulates some practices quite severely. All trees less than 18 inches d.b.h. in old growth stands must be left. At least 10 seed trees per acre greater than 18 inches in diameter must be left after harvest. Young growth being cut for sawtimber or veneer must meet the same requirements. Seed trees must be approved by the state forester firewarden. Young growth cut for other forest products must have at least: (1) 420 trees per acre less than 4 inches d.b.h., or (2) 150 trees per acre 4 to 6 inches d.b.h., or (3) 75 trees per acre 8 to 10 inches d.b.h., or (4) 40 trees per acre 12 inches or more d.b.h. Tractor logging is prohibited on wet or saturated soils or unstable soils.

No harvesting, skidding, rigging, or construction is allowed within 200 feet of any body of water unless a variance is granted. Soil erosion from skid trails, landings, roads, and firebreaks must be minimized. When necessary, roadside berms must be constructed, waterbreaks and culverts must be installed, or drainage must be outsloped in lieu of waterbreaks. Seeding of roads, landings, and trails is required upon completion of operations. Fire prevention and suppression practices are addressed. Tractor logging on slopes greater than 30 percent is prohibited unless a variance is granted. The Board of Forestry and Fire Control also makes rules governing skid trails, felling techniques, stump heights, slash disposal, and insect and disease protection.

NEW HAMPSHIRE

TITLE: Act Relating to Forest Conservation
and Taxation of 1949
N.H.R.S. 79:3, :10-:12 & :19. N.H.R.S.
224:44-a & 224:44-b (slash disposal, 1971)
N.H.R.S. 149.8-a & 149:19 (pollution of waterways, 1971)

LEAD AGENCY: Department of Resources and Economic Development,
Division of Forests and Lands
Water Supply and Pollution Control Commission

STATE CONTACT: John E. Sergeant, Chief
Forest Fire Service
Department of Resources and Economic Development
Division of Forests and Lands
P.O. Box 856
Concord, New Hampshire 03301
603/271-2217

NEW HAMPSHIRE ACT RELATING TO FOREST CONSERVATION AND TAXATION

Introduction

New Hampshire does not have a state forest practices law per se, but does regulate timber harvesting in several ways through modern, piecemeal legislation. The Act Relating to Forest Conservation and Taxation is a timber yield tax law which requires that stumpage owners file "intent to cut" forms with the local assessing officials before beginning timber operations. They must also report the total volume harvested at the completion of operations. A separate state statute requires timber harvesting plans to be sent to the Water Supply and Pollution Control Commission 30 days before commencing operations, and requires that written permission be obtained from the Commission before undertaking any activities that might alter the land and create new, unnatural runoff (N.H.R.S. 1971a). Logging and skidding roads are the focus of this requirement.

New Hampshire is currently engaged in a Statewide Forest Policy Study involving citizens of the state that have met and discussed nine forest issues. This will lead to a Forest Policy for the 1980's and a Forest Planning Section with the state foresters staff.

Enforcement of the present New Hampshire law has been strict. As a result, the laws have been fairly effective at accomplishing their intent. Implementation of the law is handled primarily by fire control officers. Although the fire control officers have no enforcement authority in RSA 149.8-a (Dredging Law) they do report violators. Plans for a law change in the 1981 legislative session will allow staff from the Division of Forests and Lands to enforce 149.8-a.

Legislative Policy and Purpose

As amended through 1979, the Act Relating to Forest Conservation and Taxation declared that the care and protection of forest cover adjacent to certain waters of the state and along public highways, and the proper removal of slash and mill waste is necessary and in the interest of public welfare. The law is intended to conserve the quality of state waters, reduce the incidence and severity of forest fires while continuing to meet the timber needs of forest industries. The law also promotes healthful surroundings, recreational opportunities, scenic values, improved wildlife habitat and the perpetuation of a proper forest cover.

Purpose and Outputs Designed to Protect

New Hampshire timber harvest laws require leaving buffer strips of trees along public roads, streams, rivers and other public water bodies (Section 224). Since 1909, they have required the clean-up of slash and mill waste within certain distances of these roads, railroads, water bodies and along property boundaries (Sec. 224). Section 224 can also require the removal of lumber slash or other flammable material in the interest of preventing or controlling forest fires. Section 79 is the timber tax law requiring the reporting of forest cutting operations and payment of a timber tax. The New Hampshire Dredging Law (Sec. 149) regulates altering the shape of the land, including by skid and log roads, to protect water quality. Harvest systems, improvement practices, and the regeneration of seedlings to restore areas to full productivity are nonregulated practices.

Applicability and Exemptions

The law applies to private landowners and timber operators. Clearing land for single house or business construction, agricultural activities, mining activities, road or highway construction for nonforestry purposes, commercial and industrial development and utility rights-of-way does require "intent to cut" permits unless the wood is for personal use.

Violations and Penalties

According to Section 79 and 224, failure to obey the law is a misdemeanor with a fine not to exceed \$1,000. Failure to apply for a cutting permit is punishable by a fine not to exceed \$100. There is a fine of \$100 if an owner fails to file volume cut at harvest. Failure to report may also result in doubling of taxes. According to Section 149, the disposal of logging wastes in a body of water can result in fines of up to \$1,000 per day. Altering land near water without written permission can result in a fine not to exceed \$25,000, six months in jail, or both.

Forest Practice Rules

According to Forest Practice Rules adopted in 1971, slash and mill waste may not remain in any river, stream, or brook. It may not remain within 25 feet of the land of another person, or any stream, river, or brook which can float a canoe at normal level. It may not be within 50 feet of any great pond or navigable river, the nearest edge of a public highway, or within 60 feet of a railroad right-of-way, or within 100 feet of an occupied building. Slash and mill waste may not extend more than 4 feet above the ground between 50 and 150 feet of any great pond, navigable river, stream, brook, or public highway

without written consent of the state forester. Equipment, supplies, or other waste cannot be disposed of in any stream, lake, or pond. Altering land near bodies of water so as to change the natural runoff patterns is prohibited without the written consent of the Water Supply and Pollution Control Commission.

RSA 224:44a, The Timber Harvest Law, requires buffer strips to be left in timber management zones where no more than fifty percent of the basal area of timber can be removed. These management areas comprise twenty-five percent of the state's total acreage. A small stream requires a buffer zone 100 feet wide and 50 feet on each side where fifty percent of the basal area is left. All public roads must have a 150 foot zone. These regulations have been effective in forest management, fire hazard reduction and preservation of the scenic areas of the state.

OREGON

TITLE: Oregon Forest Practice Act of 1971
ORS Sec 527.610 -- 527.990

LEAD AGENCY: State Board of Forestry

STATE CONTACT: Jim Brown, Program Director
Forest Practices Division
Oregon Department of Forestry
2600 State Street
Salem, Oregon 97310
503/378-2494

OREGON FOREST PRACTICES PROGRAM

Introduction

Oregon became a pioneer in developing forest practices laws in 1971. That year, the state legislature passed the Oregon Forest Practices Act to protect the environment during logging and other forest operations. The law became effective on July 1, 1972. It replaced the Oregon Conservation Act of 1941, which had been a "first" in its time among state laws requiring conservation. The 1941 law was thought to be very progressive legislation and is considered the forerunner of the current Forest Practice Act which, unlike the 1941 law, addresses all forest resources.

The Forest Practices Act authorizes the State Board of Forestry to set specific rules covering reforestation, road construction and maintenance, harvesting of forest tree species, application of chemicals and disposal of slashing. Each year there are approximately 14,000 active operations on private forest lands. It is the potential for damage to forest streams and soils, and the mounting concern for water quality, flood erosion control and fish and wildlife habitat that has added emphasis to forest environmental protection in Oregon. Each operation is required to be conducted in full compliance with the rules and regulations of the Department of Environmental Quality relating to solid waste control and air, water and noise pollution control. In addition, the Environmental Protection Agency has recognized the Oregon Forest Practice Act and rules as meeting the requirements for best management practices under the 208 program of the Clean Water Act of 1977.

The primary thrust of the Oregon Forest Practice Program is directed towards education and prevention rather than regulatory or remedial action. The effectiveness of the program is reflected in the 98 percent compliance rate with forest practice regulations. Most industrial foresters consider the Oregon Forest Practice Act of 1971 as the most workable of the three Pacific Coast states' laws. Oregon's enabling legislation is by far the shortest of the three states. The administration of the law is the least complicated, both in terms of landowner and agency actions required and the number of

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agencies involved in the administration. The application of the law to both public and private lands was a unique feature of the law when it was passed.

The Oregon Department of Forestry considers the law to have been effective in reducing debris and sedimentation in streams and increasing land reforestation. The law is flexible and receives considerable interagency cooperation. Since the Act went into effect in 1972, other states have been following Oregon's lead in developing legislation to protect the forest environment.

Legislative Policy

The Oregon Forest Practice Act of 1971 recognizes the social, economic, environmental, and wildlife benefits that forests contribute to Oregon, and declares as public policy the encouragement of forest practices that maintain and enhance these benefits. The law vests in a State Board of Forestry authority to develop and enforce regional rules that:

"....assure the continuous growing and harvesting of forest tree species and protect the soil, air, and water resources, including but not limited to streams, lakes, and estuaries"; and

"achieve coordination among state agencies which are concerned with the forest environment."

Method of Establishing Forestry Practices

The law is an enabling act requiring the State Board of Forestry to establish at least three forest regions and a concomitant nine-member forest practices committee for each region. The committees are to recommend appropriate regional forest practices to the State Board of Forestry, which is responsible for promulgating appropriate rules and regulations.

Responsible Agency and Method of Administration

The law is administered and enforced by the Oregon Department of Forestry. Any appeals to actions taken by the State Forester in enforcing the law must be made to the State Board of Forestry. Operators, timber owners, or landowners must notify the state forester on forms provided by the Department before commencing operations. Alternate plans to the rules are acceptable if they propose equivalent or better forest practices and receive written approval of the state forester.

The rules promulgated by the State Board to be administered by the State Forester establishing minimum standards for forest practices must relate to:

- (a) reforestation of forest land economically suitable;
- (b) road construction and maintenance operations on forest land;
- (c) harvesting of forest tree species;
- (d) application of chemicals on forest land; and
- (e) disposal of slashing on forest land.

Applicability and Exemptions

The Oregon law applies to all nonfederal public lands and to all private lands. Notification is required for harvesting of forest crops, road

construction or reconstruction, site preparation, application of chemicals, conversion of forest lands, treatment of slash, and pre-commercial thinning. Notification is not required for routine road maintenance, recreational uses, grazing, tree planting and direct seeding, Christmas tree culture, or harvesting of minor forest products. Waiver of notification does not relieve the owners or operators from the responsibility of complying with all applicable forest practice rules.

Violations and Penalties

When significant violations are identified, the State Forester can encourage compliance or can order the violator to cease the illegal activity and repair the damage. Appeals are to the Board of Forestry, and, if necessary to the court. Failure to give notice or to follow the rules established by the Board is a misdemeanor punishable by a fine not to exceed \$1,000 or one year imprisonment, or both for each day the violation occurs.

Rules and Regulations

The regulations promulgated by the Board require reforestation of at least 100 desirable seedlings per acre after harvest, or a basal area exceeding 80 square feet per acre of trees greater than 11 inches in diameter. The Board also established regulations, as required, for road location, road specification, road construction, and road maintenance. Harvesting rules cover the quality of the residual stand, soil protection, location of landings, skid trails, fire trails, drainage systems, treatment of waste materials, and stream protection. The regulations also control surface mining practices, protection of water quality during mixing and application of chemicals, and maintenance of productivity by proper disposal of slash.

Forest practice rules require operators to notify the State Forester at least 15 days before starting operations. This advance notice gives forest practice officers a chance to preview work sites, identify problem areas, and help operators avoid damaging the environment.

The State Forester must meet once each year with other state agencies concerned with the forest environment to review the forest practice rules relative to sufficiency. Recommendations for amendments to rules, new rules, or repeal of rules are forwarded to the Board of Forestry.

WASHINGTON

TITLE: Washington Forest Practice Act of 1974 (Amended through 1975)
Rev. Code of Washington Annotated
76.09.010 -- 76.09.935. Washington
Forest Practice Rules and Regulations - 1976
Washington Admin. Code Sec. 222-08 -- 222-50

LEAD AGENCY: Forest Practice Board

STATE CONTACT: Burt Cole, Commissioner
Public Lands
Division of Natural Resources
Olympia, Washington 98504
206/753-5327 or 5315

WASHINGTON FOREST PRACTICE PROGRAM

Introduction

The Washington Forest Practice Act of 1974 replaced the state's 1945 forest practice law. The rules and regulations authorized by the 1974 law and 1975 amendments became effective in 1976 after two years of debate regarding their coverage.

The Act was passed at the peak of environmental concern and represents a legislated compromise between strong environmental groups, state agencies, and timber interests. The law reflects this controversy by its complexity and its multiple agency approach to regulating forest practices. Although criticism is diminishing as experience in administering the law is gained, the law was criticized along many lines. The Departments of Ecology, and Fisheries and Game were thought to be too narrow in their outlooks -- being concerned only for the resources under their charges. Also, the departments were charged with having little concern for the costs incurred by forest landowners. These problems and strong protests from the forestry community led to significant revisions by the legislature in 1975 through passage of H.B. 1078.

Legislative Findings and Purpose

The Washington Forest Practice Act of 1974, as amended, requires adoption of a comprehensive, statewide system of laws and forest practice regulations which will achieve a number of objectives including the following:

- (a) encourage timber growth and require a minimum level of reforestation;
- (b) afford protection to forest soils;
- (c) recognize the public and private interest in the profitable growing and harvesting of timber;
- (d) promote efficiency by allowing maximum operating freedom;
- (e) avoid unnecessary duplication of forest practice regulations;

- (f) provide for interagency input and intergovernmental coordination and cooperation;
- (g) achieve compliance with all applicable federal and state laws regarding nonpoint source pollution; and
- (h) consider reasonable land use planning goals contained in local comprehensive plans and zoning regulations.

The law recognizes forest practice regulation as an important means of protecting forest soils, fisheries, wildlife habitat, water quantity and quality, air quality, recreation, and scenic beauty.

Method of Establishing Forestry Standards

The Washington law is an enabling law, delegating authority for promulgation of rules and regulations to a Forest Practices Board. The Board is required to prepare forest practice regulations with the advice of a Forest Practices Advisory Committee. Water quality regulations are prepared by the State Department of Ecology. Draft regulations are submitted for review to county governments and the Department of Fisheries and Game. Prior to final adoption, the law directs the Forest Practices Board and the Department of Ecology to jointly hold one or more additional hearings on the proposed rules.

The Forest Practices Board must also determine which forest practices are to be included in one of four environmental and administrative classes. Class I includes minimal or specific forest practices that have no direct potential for damaging a public resource. Class II forest practices have less than ordinary potential for damaging a public resource. Class III forest practices are those not included in Class I, II, or IV. Class IV forest practices include those which may have a potential for substantial impact on the environment and may also require a state environmental impact statement. The Departments of Natural Resources, Ecology, Fisheries and Game must classify waters of the state into one of five types. The classification along with the administrative classes is used to determine the forestry practice regulations that apply.

Responsible Agency and Method of Administration

Depending on the administrative class within which a forest practice falls, the forestry activity may require only compliance with standards, or it may require a notification or a permit. Class I forest practices require no notification, only compliance with pertinent rules and regulations. Class II actions require notification of the Department of Natural Resources. If no reply is received within five days, the operation may then begin. Class III actions require an application to the Department which also must be approved or disapproved within 14 calendar days. Class IV practices require an application to the Department which must be acted on within 30 calendar days unless the Department decides an environmental impact statement is necessary in which case a decision must be made in 60 days. Local, county, or regional governments may also require a detailed impact statement if the practice falls within their area of jurisdiction.

While the Department of Natural Resources is the primary administering and enforcing agency, the Department of Ecology may also make field inspections to insure compliance with water quality rules. Forest practices are still required to meet all the pertinent rules and regulations of any other government body in the state. Inspections are made before, during, and after

operations to check compliance with the law. Landowners may submit a notification when reforestation has taken place, at which time the Department must make an inspection.

Applicability and Exemptions

The law applies to all forest landowners. The rules and regulations adopted by the Forest Practices Board regulate road construction and maintenance, timber harvesting, reforestation and application of forest chemicals. Practices exempt from regulation include tree marking, surveying, and road flagging, and removal of ferns, berries, mushrooms or other minor forest products. Forest practices regulations may identify forest lands that could be likely to be converted to urban development within 10 years. Reforestation requirements may be eliminated provided the conversion is in compliance with local or regional land use plans or ordinances.

Violations and Penalties

If an operator, timber owner or forest landowner does not take corrective action on a violation of the law, the Department may issue a stop work order. If the stop work order is not obeyed by the party involved, they may be prohibited from all operations in the state for up to one year. Counties may also bring suits for enforcement against the Department of Natural Resources or Ecology, the forest landowner, the timber owner, or the operator.

Violations of forest practices regulations are subject to a \$500 fine per violation. Each and every violation is a separate offense. Failure to comply with a stop work order is subject to a separate violation for each day.

Any person who knowingly violates any forest practice rule or aids another to do so is guilty of a gross misdemeanor and shall be punished by a fine not less than \$100 or more than \$1,000, or imprisonment for not more than one year, or both. Each day the violation occurs will constitute a separate offense.

Forest Practices Covered

The law defines a forest practice as any activity conducted on or pertaining to forest land, or activity relating to the growing, harvesting, or processing of timber, including but not limited to road and trail construction, final and intermediate harvesting, pre-commercial thinning, reforestation, fertilization, prevention and suppression of diseases and insects, salvage of trees, and brush control. The rules and regulations promulgated by the Forest Practices Board address road location and design, road construction, water crossing structures, road maintenance, rock quarries, gravel pits, borrow pits, and spoil disposal areas.

Timber harvesting rules include harvest unit planning and design, stream bank integrity, temperature control, felling and bucking, cable yarding, tractor and wheeled skidding systems, landing cleanup, post-harvest site preparation, and slash disposal. Reforestation standards for western Washington State require at least 300 vigorous, well-distributed seedlings of desirable species to be present on the site after harvest. The rules also regulate site preparation and the handling, storage, and application of forest chemicals.

PART IV
SUMMARY AND DISCUSSION*

- * This section provides an update and revision, where necessary, of the "Summary and Discussion" Section in Dr. Paul V. Ellefson's report: State Forest Practice Laws and Regulations: A Review and Case Study for Minnesota: pp. 16-18.

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Purpose and Forest Outputs Addressed

According to Dr. Paul V. Ellefson, modern forest practice laws such as those enacted in California, Oregon, and Washington usually state a purpose or policy decreed by the state legislature. He points out that most laws are aimed at protecting environmental quality and ensuring continuous productivity of forest lands. Most regulate forestry activities so as to protect water, wildlife, fisheries, soil productivity, recreation and aesthetics. Some recognize the economic contribution of timber harvesting to the economy. Nevada and California laws regulate primarily timber harvesting and reforestation, while Oregon, Idaho, and Washington regulate virtually all forest management activities. None regulate all the activities that may take place within the forest boundaries.

It is Dr. Ellefson's opinion that not all the statements of policy or purpose contained in the laws are totally clear, nor can all the policy statements actually be fulfilled by regulations contained in the laws. The California law, for example, declares numerous broad environmental protection goals but emphasizes only timber harvesting activities. The Washington law lists several goals, not all of which are effected by the law. For example, one of its objectives is to eliminate unnecessary duplication of forest practices regulation, yet the law fails to supersede most existing forestry regulations or eliminate the necessity for landowners to deal with up to eight different agencies when performing a forest practice. Ideally, one would expect a state forest practices law to clearly state its goals and to fulfill those goals in the law.

Method of Establishing Forestry Standards

Forest practices regulations can be established in one of two general methods. They can be specified in the law by the state legislature, or they can be promulgated by some other official body delegated the authority to do so by an enabling law. Regulations were written directly into the law in most of the older forest practices laws. All the modern laws, except New Hampshire, provide for some form of subsequent rule-making. (Rule-making authority is directed to the State Forester in N.H. Law 218.) Nevada combines the two methods by having most of the regulations written into the basic law and providing for a few to be promulgated at a later date by the State Board of Forestry and Fire Control. California law combines the two methods by providing for subsequent rule-making, while specifying minimum stocking standards that subsequent rules must meet or exceed.

In an enabling law, the manner in which the rules and regulations are promulgated varies considerably. All the modern state forest practice laws delegate the rule-making authority to an existing or newly created forest practice board or Board of Forestry. Several of the old forest practice laws delegated the authority to existing state agencies such as a Department of Natural Resources or a Division of Forestry.

While the actual rule-making authority may be delegated to a board, the boards do not act unilaterally. They may receive technical advice from the state division of forestry, state or regional technical advisory boards, from other state agencies, from public hearings and written testimony, or from all of the above.

Method of Administration and Responsible Agency

The approach to administering a state forest practices law depends on whether the law requires compliance with standards, notifications, or permits to control forestry activities. Modern forest practice laws encompass all three variations. The Maine law covers only special land use zones; consequently some parts of the state are not regulated at all. In the regulated zones, some activities need only comply with standards, while other zones require a permit before operations may begin. The New Hampshire law relies on compliance with forest practice standards except for altering land along streams or other bodies of water, which requires a permit. Oregon and Idaho laws operate exclusively on notification systems. Washington combines standards for Class I actions, notifications for Class II actions, and permits for Class III and IV operations. By requiring submission of a timber harvesting plan prepared by a registered forester and approved by the Department of Forestry, California employs a de facto permit scheme for timber harvesting plans. Nevada possesses the strictest administrative framework, requiring preparation of timber harvesting plans and posting of a performance bond before a logging permit will be granted.

In administering their law, Oregon and Idaho inspect a percentage of the operations to ensure compliance, usually inspecting at the highest rate those operations with the greatest potential for environmental damage. Nevada foresters inspect operations before and after harvest. In Washington and California, the state forester must inspect operations before, during, and after they begin. The state forester must also inspect operations after regeneration has been completed and may inspect at any other time deemed necessary.

Different government agencies may administer the law. Usually the authority is delegated to the State Natural Resources Department or Forestry Division. Washington's law is administered primarily by the Department of Natural Resources, but the Departments of Ecology, Fisheries and Game and the pertinent county must also be consulted before operations begin. The Department of Ecology is also authorized to make field inspections to ensure adequate water quality control. Maine's Land Use Law is administered by the Maine Land Use Regulation Commission. Three different New Hampshire agencies administer the tax provision, water control provisions, and slash and mill waste provisions in the state.

Applicability and Exemptions

Forest practice regulations usually apply to all private landowners and operators, such as the laws in Maine, New Hampshire, and California. In addition, they may also apply to all public, non-federal landowners, such as the laws in Oregon, Nevada, Washington, and California. In Idaho, all responsibility is upon the operator. Forest practice laws could regulate all activities that take place within forest boundaries. State legislatures have not, however, seen fit to enact forest practice laws that do so. The California, Nevada, New Hampshire, and Maine laws address primarily timber harvesting and road construction activities.

Most of the laws exempt constructing rights-of-way, firewood cutting for personal use, and harvesting of minor forest products such as fruits, nuts, and berries. Christmas tree culture and salvage of insect and disease damaged trees is also usually exempt. Idaho exempts forest conversion and Oregon allows it for legitimate purposes. Washington, California, and Nevada severely restrict forest conversion.

Violations and Penalties

In Oregon, Washington, California, and Idaho, enforcement authority ranges from personal conferences with violators to the states taking corrective action and placing a lien on the landowner's or timber operator's property. Citations for violations and restraining or stop work orders are the intermediate enforcement tools in the four states. Violation of the law in the states is usually a misdemeanor punishable by fines of up to \$1,000 or jail sentences of up to one year, or both. In addition, Washington may ban loggers from operating for up to one year after violation and California can deny, suspend, or revoke a timber operator license until the violation is corrected.

Nevada, New Hampshire, and Maine provide penalties of fine or imprisonment as their primary tools of enforcement. Fines in Nevada may range up to \$500 and jail sentences up to six months. Operators may also forfeit their performance bond if they do not comply. The Maine Land Use Regulation Commission may levy fines up to \$500 and also can issue stop work orders and take corrective action. New Hampshire fines may range up to \$1,000 for disposal of waste in waters or up to \$25,000 for illegally altering land near bodies of water.

Forest Practices Covered

A complete listing of all forest practices regulated by law is prohibitively long, but a description of the general categories addressed is feasible. New Hampshire regulates timber harvesting and forest road construction near waters and highways in piecemeal fashion through modern regulations. Maine's land use regulations generally regulate only timber harvesting and road construction in sensitive areas such as recreation sites, steep slopes, high elevation, or near streams and lakes. California's and Nevada's new state forest practice laws address reforestation, timber harvesting, and the concomitant transportation networks required to guarantee restocking and to protect water quality. Oregon, Idaho, and Washington address a broader array of forest management activities including timber harvesting, road construction, chemical and fertilizer use, slash management, site preparation, and pre-commercial thinning.

Severity of Forest Practice Regulations

A legal resources scale to give some idea of the severity of regulation or the aggressiveness of the regulator is provided in Dr. Ellefson's report. Determinants of the severity of regulation include direction and clarity of policy objectives, substantive scope of authority, geographic scope of authority, sanctions available, administrative structure, and citizen participation. Other resources which may affect agency regulating policy include technical, monetary, and personnel resources, leadership ability within organizational constraints, attitudes and resources of agency heads, support of constituency groups, and relations with other agencies.

Using this framework for analysis, Dr. Ellefson concludes that most of the older forest practice laws and the New Hampshire and Maine laws are less severe than the new western forest practice laws. The former are smaller in their substantive and geographical scope of authority and are generally more limited in the range and severity of their sanctions. Of the older laws, Maryland and Massachusetts have the strongest laws due to their statewide applicability and structure allowing for subsequent regulation of all forest management activities. Virginia, New Mexico, and Mississippi are much less aggressive in their regulation, addressing primarily the leaving of seed trees. New Mexico and Mississippi have only nominal enforcement of the laws and token fines. The Missouri, New York, and Vermont laws provide even smaller penalties, relying primarily on voluntary cooperation. The Florida and Louisiana laws might as well be repealed since they are not used. The modern New Hampshire and Maine laws are rather weak because of their limited geographic application to forestry, although they do carry significant financial penalties for violation.

Of the five western states, Nevada's law is the most limited in its geographic scope since it is currently only being used on the five percent of the state which has commercial forests. However, the law could be expanded to cover 11 million acres of pinyon-juniper lands if fiber demands increase. It also has the strictest administrative requirements since it necessitates performance bonds and timber management plans before operations may begin.

The Oregon and Idaho laws have strict regulation which have a wide substantive and geographic scope. They regulate most forest management activities in states which have large areas of forest land. They also have a considerable range of sanctions and considerable citizen participation in the rule-making process. Oregon's Department of Forestry provides a strong administrative structure, but Idaho's is weaker in terms of personnel and funding. It has been suggested that the aggressiveness of the Oregon law may be weakened by the dominance of timber interests on the State Forestry Board, the timber production orientation of the Department of Forestry, and the strong timber interests in the state.* Both Oregon and Idaho operate on a notification system which is less strict than a permit system. These factors combine to make their laws less stringent than the California and Washington laws.

California and Washington possess the most severe state forest practice laws. They have the same wide scope of authority and sanctions available as in the Oregon and Idaho laws. In addition, California requires the submission and approval of a professionally prepared timber harvesting plan, a de facto permit system. Washington requires notification for less significant forest practices and application and approval for more significant forest activities. The two states have large technical and personnel resources and are required to inspect all activities before, during, and after operations. The enforcing agencies are rigorous in review and approval plans and in inspections. Strong environmental groups and other state agency input into the rule-making process also increases the degree of regulation.

* Anderson, Gordon B., 1977a. "Oregon's Forest Conservation Laws - Part I." American Forests 83(3):16-19, 52-56.

PART V - APPENDICES

APPENDIX A

DIGEST OF STATE FOREST PRACTICE LAWS

REPRODUCED FROM THE
FOREST PRACTICE LAWS

Digest of State Forest Practice Laws

State and Administrative Agency	Title of Law and Pertinent Code	Purpose and Outputs Designed to Protect	Method of Establishing Practices	Method of Administration
California California Department of Forestry The Resources Agency	Z'berg-Nejedly Forest Practice Act of 1973 California Public Resources Code Division 4, Chapter 8, Sections 4511-4628 (enabling law) California Administrative Code Title 14, Subchapter 4.1, Chapter 2, Division 2 (rules and regulations)	Policy of act (1) Encourage prudent and responsible forest resource management to serve the need for timber and other forest products while protecting watersheds, fish and wildlife, and recreation opportunities in this and future generations. (2) Does not intend to take private property for public use without payment of just compensation. Outputs protected: timber productivity, recreation watersheds, wildlife, range and forage, fisheries, aesthetic enjoyment	Act establishes a new nine member Board of Forestry which is delegated the authority to adopt forest practice rules. Board members are appointed for staggered four year terms and subject to Senate confirmation. Five members from the general public, three from the forest products industry, and one from the range and livestock industry. No public member may have a direct financial interest in timberlands. Board directed to divide the state into at least three districts based on climate, soil type, principal forest practices and other relevant factors. Board also appoints district technical advisory committee to advise the board in the establishment of district forest practice rules to govern timber operations. Advisory committees must have the same membership makeup as the board. An employee of the Department of Forestry acts as secretary and tie-breaker vote. Committee directed to maximize interagency cooperation and input in identification of problems and proposing solutions. Counties and the Lake Tahoe Regional Planning Commission may adopt rules and regulations which are stricter than those provided for in the act or made by the board	Act is administered by the state forester and the employees of the California Department of Forestry. Timber operators are required to be licensed by the State Board of Forestry by separate law. Registered, professional foresters must prepare a timber harvesting plan which landowners or operators must submit to the department before cutting operations may begin. Department may then inspect proposed harvest area. If landowner does not hear from the department within a specified time after inspection, he may proceed. Timber owner or landowner must also notify the department upon completion of operations. Within five years after harvest, he must file a report on the stocking or regeneration of the area. The state forester or his employees should inspect the area before plan approval, during harvest operations, after the harvest, and after submission of the stocking report to insure compliance. The department may also inspect at any other time deemed necessary to enforce the law
Florida Florida Division of Forestry, Department of Agriculture and Consumer Services	Seed Tree Law—1943 Florida Statutes Annotated Sections 591.27-591.34	Designed to protect pine seed trees for regeneration purposes and to maintain forest productivity	By state legislature in the basic act	Seed trees must be branded with a "ST" by the Florida Division of Forestry and thereafter may not be cut without permission of the Florida Commissioner of Agriculture and Consumer Services

Applicability and Exemptions

Applies to all private lands, whether they belong to individuals, partnerships, corporations, or organizations. Rules and regulations apply to all timber harvesting operations. Timberland conversion requires a permit and can be denied on a number of bases.

Constructing rights-of-way, Christmas tree culture, fuelwood cutting, or removal of dead, dying, or diseased trees may be exempt by board regulations.

Applies only to landowners who request to have seed trees marked. Law has never been used.

Violations and Penalties

To stop violations, the Department of Forestry may initiate court action to obtain a restraining (stop work) order on the operation. The court may also order the defendant to take corrective action or authorize the department to do so. Any expense incurred by the department becomes a lien on the landowner's property.

If the timber operator does not obey a court ordered restraining order, he may be prohibited from performing any timber harvesting activities in the state.

Violations are a misdemeanor punishable by a fine of up to \$500, imprisonment in the county jail for up to six months, or both.

Cutting trees is a misdemeanor punishable by a fine of up to \$500 or up to six months in jail, or both.

Forest Practices Rules

Rules and regulations made by the board are contained primarily in Articles 3 through 10 of the California Administrative Code. Article 3 regulates silvicultural methods which may be used and sets minimum stocking levels that must be met after harvest or thinning. Areas harvested must contain an average point count of at least 300 per acre, calculated as follows: 1) each countable tree not more than 4 inches d.b.h. to count as 1; 2) each countable tree between 4 and 12 inches d.b.h. to count as 3; and 3) each countable tree over 12 inches d.b.h. to count as 6. Or the area may have an average residual basal area of stems greater than 1 inch d.b.h. of at least 85 square feet per acre on site class I lands or 50 square feet per acre on site class II or lower lands. Or for redwood root crown sprouts, one sprout for each foot of stump diameter may be counted up to a maximum of six per stump. Article 3 contains additional rules and regulations which may be required in addition to or substitute for the above minimum requirements. The rules vary slightly in each of the three districts in the state. Silvicultural and harvesting methods addressed in the rules include commercial thinning, shelterwood, seed tree, clear cutting, and sanitation and salvage cuts.

Article 4 requires protection of water quality, maintenance of soil productivity, protection of young seedlings and residual trees. It also requires careful felling practices, tractor yarding, cable yarding, landing selection, debris disposal, and logging equipment service.

Article 5, erosion control, regulates logging roads, road drainage, tractor roads, landing location, and waterbreaks. The severity of regulation of practices depends on the soil erosion class of the soils in the harvest area. The classes are appended to the regulations.

Article 6, stream and lake protection, sets standards for timber operations, stream crossings, harvests in designated stream and lake protection zones, operating equipment in or near streams, exclusion of debris from streams, and harvests in wet areas or wet meadows.

Article 7, hazard reduction, regulates snag disposal and retention, slash burning, and protecting residual trees during slash burning.

Article 8, fire protection, requires timber operators to file yearly fire plans, keep roads passable, post fire rules, warn employees to obey rules regarding lunch and warming fires, watch welding fires, prohibit uncovered glass containers, and clear areas around cable blocks.

Article 9 requires silvicultural prevention of build-ups of forest pests or pathogens, and requires that any such breakouts be reported to the Department of Forestry.

Leave not less than three or more than eight pine seed trees of the species being harvested, marked in accordance with the rules and practice of good forestry.

State and Administrative Agency	Title of Law and Pertinent Code	Purpose and Outputs Designed to Protect	Method of Establishing Practices	Method of Administration
Idaho Idaho Department of Lands Division of Forest Resources	1974 Idaho Forest Practices Act Idaho Code Sections 38-1301 to 38-1312	Purpose: (1) Policy of state to encourage forest practices on public and private lands that maintain and enhance social and economic benefits as well as soil, air, and water resources and providing habitat for wildlife and aquatic life. (2) Assure continuous growing and harvesting of forest tree species while providing the above benefits. Outputs protected: timber supplies, soil, air, and water resources, and wildlife and aquatic habitat.	Law directs the Idaho Board of Land Commissioners to adopt minimum standards for the conduct of forest practices in the state. Board is composed of the governor, attorney general, state auditor, secretary of state and superintendent of public instruction (Idaho Code sec. 58-101). The Idaho Department of Lands is directed to appoint a seven member forest practices advisory committee to provide technical assistance to the board. Three of the members are required to live in the Northern forest district, three in the Southern, and the remaining one must be an Idaho resident. Members serve three year terms. Regulations took effect in 1976 after legislative approval.	Act is administered by the Director of the Idaho Department of Lands. The operator, timber owner, or landowner must notify the department before forest operations may begin. Department prepared management plans are in lieu of following the rules and regulations, as are similar plans approved by the local Soil Conservation District Board. The department is directed to achieve coordination and cooperation with other state agencies in administering the law and to provide management assistance to private landowners and timber operators. Notification is required for timber harvesting, road construction, reforestation, application of fertilizers and chemicals, and pre-commercial thinning.
Louisiana Louisiana Forestry Commission	Turpentine Seed Tree Law—1922 Louisiana Revised Statutes Annotated Sections 56:1493 and 1494	To leave seed trees for regeneration on lands where trees are being bled for turpentine.	By state legislature in the basic act.	Administration of law delegated to the Louisiana Forestry Commission along with other general forestry law. No notification or permits required.
Maine Maine Land Use Regulation Commission	Maine Land Use Regulation Law—1969 Maine Revised Statutes Annotated Title 12 Sections 681-689	To prescribe standards for the use of air, land, and water in the state of Maine.	Practices prescribed by the Maine Land Use Regulation Commission. Commission classifies various land use districts according to their geographic, social, biological, and economic uses. Official land use maps designate that all parts of the unincorporated areas of the state fall into one of the land use districts decreed by the Commission. Degree of restriction on practices depends on which land use district the activity takes place within.	Depending on which land use district the practice takes place within, the practice may require permits from the Land Use Regulation Commission or compliance with the commission's standards, or may not be regulated at all. Forest management usually only needs to comply with commission standards, except for timber harvesting. Timber harvesting in most environmentally or aesthetically sensitive areas requires a permit.
Maryland Maryland Forest Service Department of Natural Resources	1943 Forest Conservancy District Law Annotated Code of Maryland Natural Resources Article Sections 5-388 to -400	Designed to insure the proper use, development, and preservation of forests, timberlands, woodlands, and soil resources of the state. Designed to protect soil resources, prevent floods, improve wildlife productivity, and protect young timber and regeneration.	Forest practices rules may be promulgated by the Department of Natural Resources after advice from District Forest Practice Boards. Boards should publish proposed rules and regulations and hold hearings before submitting rules to the department. Board rules should address restocking, protecting young growth, and limiting use of clear cutting. Act also directs private landowners to meet good practice standards. Alternate plans to achieve goals of the act are acceptable. Board rules have been only advisory in nature, not mandatory.	The Department of Natural Resources administers forest conservation practices on private lands. The department must cooperate with other public agencies. The department must also direct and hear appeals from the district boards. Boards are made up of five members, each representing one major type of forestry or woodworking interest, and at least one farm, woodland owner. Board members appointed by the department. Board has the responsibility for enforcing rules and regulations adopted by the department. Boards currently congruent with counties.

Applicability and Exemptions

Applies to all non-federal public land in the state. State prepared or alternate management plans are acceptable in lieu of compliance with the rules and regulations. Conversion of forest land to other uses is allowed.

Notification not required for routine road maintenance, recreational use, grazing, Christmas tree culture, or harvesting of minor forest products.

Ownerships of less than 10 acres are exempt from regeneration and stocking rules.

Applies only to private owners bleeding or cutting pine trees for turpentine. Is not currently being used.

Applies to private timber owners and operators. Permits required for fertilization within 250 feet of water, or timber harvesting within 1/2 mile of a recreation lake, 100 feet of a recreation trail or stream, on slopes greater than 60 percent above 2,700 feet in elevation, or in scenic or scientific areas.

Applies to private forest landowners. Does not apply to cutting firewood or timber for domestic use or to woodlands less than 3 acres in size.

Violations and Penalties

When violations occur, the Department of Lands must send a notice of violation to the timber operator ordering him to cease violation. If not complied with, the department may issue a stop work order for all operations. It may also order the operator to correct the violation, or take corrective action itself, if authorized by the Board of Land Commissioners. Costs incurred by the department become a lien on the personal and real property of the timber operator. If he cannot pay the costs, the amount remaining constitutes a lien on the real and personal property of the timber owner.

Violations are a misdemeanor punishable by a fine of up to \$300, jail terms up to 6 months, or both.

Violations are punishable by fines ranging from \$25 to \$100, imprisonment for not less than 30 days, or both.

The Land Use Regulation Commission has the power to issue stop work orders or orders to take corrective action.

Fines for violations of the standards or failure to obtain a permit may be up to \$500, with each day being a separate violation.

Violation is a misdemeanor punishable by a \$10 to \$500 fine or a maximum of six months in jail.

Forest Practices Rules

Timber harvesting rules require that trees of sufficient vigor and of acceptable species must be left after harvest to provide for continuous growth and harvest. Soils must be protected by proper skid trail location, landing size, and cable yarding techniques. Landing, skid trail, and fire trail location must be properly planned. Drainage systems must control the dispersal of runoff waters from exposed surfaces. Waste materials must not enter streams. Streams must be protected by avoiding skidding in or through them, avoiding cable yarding through them, and providing vegetation to shade the water, stabilize the soil, and act as a filter at the edge of the stream. Consideration should be given to aesthetics, wildlife and aquatic habitat, wildlife escape cover, and fruit and berry sites.

Road construction rules regulate landings, road specifications, and plans, road construction, and road maintenance.

Reforestation rules require restocking to at least the following minimum levels: (1) from 150 trees per acre with an average d.b.h. of 2.9 inches or less down to 20 trees per acre with an average d.b.h. of 11 inches or greater for ponderosa pine type forests, or (2) from 200 trees per acre with an average d.b.h. of 2.9 inches or less down to 20 trees per acre with an average d.b.h. of 11 inches or greater for mixed type forests. Intermediate stocking levels vary on a sliding scale depending on average d.b.h. Countable trees must be of an acceptable species. Seeding or planting may be required if satisfactory natural regeneration does not occur within three years.

Chemical equipment and containers must be kept in leakproof condition and chemicals must not be mixed near streams. Aerial and ground applications of chemicals must leave filter strips next to bodies of water. Containers must be properly disposed of. Daily records of applications must be kept, and spills must be reported immediately.

Owners must leave an average of two trees per acre for every 10 acre plot. Seed trees must be healthy, of the kind being bled for turpentine, and not less than 10 inches d.b.h.

The following standards apply, even if a permit is not required. Areas within 250 feet of a body of water cannot have harvest-created openings greater than 7,500 square feet, or harvests removing more than 40 percent of the volume of trees 6 inches d.b.h. or greater, or slash left within 50 feet of water. Soil disturbance must be minimized and filter strips must be left.

Construction of land management roads and minor water crossings requires notice to the commission. Roads must be located, constructed, and maintained to minimize erosion. Road crossing of streams must be minimized. Bridges and culverts of adequate size, cuts and fills constructed properly and revegetated, and culvert bottoms should be flush with or below streambed bottoms.

The District Forestry Boards have chosen to be advisory in nature and do not require compliance with specific minimum standards. The act itself specifies that the following standards should be met when harvesting timber: (1) leave conditions favorable for regrowth, (2) leave young growth, (3) arrange for restocking the land by leaving seed trees of desirable species or groups of trees for restocking, and (4) maintain adequate growing stock after partial cutting or selective logging.

State and Administrative Agency	Title of Law and Pertinent Code	Purpose and Outputs Designed to Protect	Method of Establishing Practices	Method of Administration
Maryland Forest Service Department of Natural Resources	Pine Tree Reforestation Law—1977 Annotated Code of Maryland Natural Resources Article Sections 5-501 to -509	Law enacted to require logging, shortleaf, or pond pine trees to be reserved or reforested upon completion of commercial cutting operations. Designed to protect pine sawtimber and pulp supplies.	Established by legislature in the basic act. Department of Natural Resources may also adopt additional rules and regulations to administer the provisions of the law if it is deemed necessary.	Cutting operations may not begin unless seed trees have been reserved or a reforestation plan has been approved by the department. The plan must be prepared by the landowner or his agent and must insure reproduction of young pine trees of desirable species. Subsequent landowners may not cut the seed trees.
Massachusetts Massachusetts Division of Forests and Parks Department of Environmental Management	Forest Cutting Practices Act -1943 Annotated Laws of Massachusetts Chapter 132 Sections 40-46	The public welfare requires rehabilitation and protection of forest lands in the state for the purpose of conserving water, preventing floods and soil erosion, improving conditions for wildlife and recreation, and providing a continuing and increasing supply of forest products in the state.	Governor must appoint a four member forestry committee representing farm woodlot owners, industrial woodland owners, other woodland owners, and the general public, with the director of the Division of Forestry as an ex-officio member. Members serve four year terms. Committee was to hold state-wide hearings, prepare tentative forest practices rules, and submit them to the commissioner of the department, who promulgates the rules. State may be divided into four forest practice regions.	Landowners proposing to cut forest products must give written notice to the director of the Division of Forestry before beginning operations. The director or his agent must inspect the area and write a management plan for the owner. If necessary the director shall mark a minimum number of seed trees to remain after harvest. The director should inspect the area during and on completion of operations and write a harvest report to the forestry committee.
Mississippi Mississippi Forestry Commission	Forest Harvesting Act—1944 Mississippi Code Annotated Sections 49-19-51 to 49-19-77	Law designed to preserve seed trees to insure regeneration and continuous production of forest products.	By state legislature in the basic act	State Forestry Commission is responsible for administering the act, but no notification is required and inspections do not have to be made. Alternate cutting plans are acceptable. Sheriffs, game wardens, and county attorneys are directed to inquire about violations of the act and report them to county circuit judges and the commission.
Missouri Missouri Department of Conservation	State Forestry Act—1945 Annotated Missouri Statutes Sections 254.010 to 254.300	A general enabling law for forestry programs in Missouri designed to protect against fires, limit timber trespass, and substitute a yield tax for part of the property tax. Practice rules are designed to provide adequate restocking of trees of desirable species and condition.	To qualify for the yield tax, landowners must enroll with the Department of Conservation, have a management plan prepared by a state forester, and follow the forest practices recommended by the Department of Conservation when harvesting timber.	At least 30 days prior to timber cutting, landowners enrolled under the program must give written notice in the Department of Conservation. Notice must be accompanied by the management plan prepared by the service forester when the land was enrolled in the program.
Nevada Division of Forestry State Department of Conservation and Natural Resources	Nevada Forest Practice Act of 1955 Amended 1971, 1973 Nevada Revised Statutes Sections 528.010-528.090	Establish minimum standards of forest practice, promote sustained productivity of forests, and preserve the natural water supplies of the state. Primary outputs protected are timber supplies, water, and soils.	Some practices established in the basic act—specifically cutting practices, erosion controls, activities near water, seed tree requirements, and fire prevention and suppression measures. The seven member State Board of Forestry and Fire Control is delegated the authority to promulgate rules to protect residual trees from damage during logging and any other rules necessary to carry out the forest practice act.	The state forester firewarden administers the provisions of the act. Before any logging or cutting operation, a timber owner must obtain a logging permit from the state forester firewarden. He must also submit a detailed harvest plan with the application and post a performance bond to insure compliance with the provisions of the logging permit.

Applicability and Exemptions

Applies to any county, state agency, municipality, or political subdivision thereof. Also applies to any individual, partnership, firm, association, or any other public or private corporation or entity.

Applies to all public and private lands in the state. Cuttings for personal use are exempt, as are harvests of less than 25,000 board feet and 50 cords. Clearing land for rights-of-way and timberland conversion is exempt. Timber operators must obtain a license.

Applies to private persons, partnerships, firms, or corporations.

Applies only to landowners who request to be enrolled in the yield tax program. Notices not required for cutting of firewood, posts, and timber for use by the owner.

Applies to all nonfederal public and to all private forest landowners. Conversion requires a permit also.

Violations and Penalties

The department, acting through the Attorney General and the county circuit court, may enforce compliance or enjoin violation of the law. Enforcement may include money damages payable to the department equal to the estimated cost of compliance. The department must use the funds to reforest the lands.

Violations are punishable by a fine of up to \$25 per acre. Failure to obtain an operator's license is punishable by a maximum fine of \$25 for each violation.

Violation is a misdemeanor punishable by a fine of not less than \$25 or more than \$50 for each separate offense. A 40-acre unit is used as the basis for checking compliance or determining multiple fines.

Violation is a misdemeanor. Non-compliance on classified lands makes owner liable for all back taxes at normal property tax rates, plus penalty, plus reimbursement to the state for all taxes paid to the county.

Violation is a misdemeanor punishable by imprisonment for not more than six months or fines ranging from \$10 to \$500, or both.

Forest Practices Rules

Unless otherwise provided for in a reforestation plan, the operator or landowner must leave uncut and uninjured at least eight cone-bearing loblolly, shortleaf, or pond pine trees 14 inches or larger in diameter eight inches above the ground. If eight such trees are not present on each acre, at least two cone-bearing trees of the next largest diameter must be left standing. Trees must be healthy, have well-developed crowns, and be well-distributed throughout the acre. Cone-bearing trees need not be reserved if there are at least 400 well-distributed, vigorous, and free-to-grow seedlings per acre on the site after completion of harvest.

Leave from 4 to 25 seed trees of desirable species per acre depending on the diameter of the seed trees. Coniferous seed trees should be left surrounded with young trees for protection. Clear cutting permitted if the harvest area has 1,000 or more seedlings per acre or if the stand is injured beyond recovery by fire, insects, or disease. Keep logging damage to residual trees to a minimum. No cutting of seed trees is allowed until the ground is stocked with 1,000 or more seedlings per acre.

Naval stores: work no trees less than 10 inches in diameter unless 100 4-inch or four 10-inch trees remain uncut per acre. Wood products: leave at least the same number of trees required for naval stores on pine sites. On hardwood sites, leave at least six 10-inch hardwood seed trees per acre or 100 4-inch trees per acre of the commercial species being harvested. On mixed sites, leave at least four 10-inch pines and two 10-inch hardwoods per acre as seed trees.

Provide for adequate restocking of trees of desirable species and condition. Reserve growing stock to keep land reasonably productive. Use reasonable efforts to prevent and suppress forest fires. Control grazing to maintain adequate stocking. Follow any additional practices recommended by the state district forester.

Leave all trees less than 18 inches d.b.h. in old growth stands and leave at least 10 seed trees per acre greater than 18 inches in diameter. Young growth being cut for sawtimber or veneer must meet the same requirements. Seed trees must be approved by the state forester/firewarden. Young growth cut for other forest products must have left at least: (1) 420 trees per acre less than 4 inches d.b.h., or (2) 150 trees per acre 4 to 6 inches d.b.h., or (3) 75 trees per acre 8 to 10 inches d.b.h., or (4) 40 trees per acre 12 inches or more d.b.h. Tractor logging is prohibited on wet or saturated soils or unstable soils.

No harvesting, skidding, rigging, or construction is allowed within 200 feet of any body of water unless a variance is granted. Soil erosion from skid trails, landings, roads, and firebreaks must be minimized. When necessary, roadside berms must be constructed, waterbreaks and culverts must be installed, or drainage must be outsloped in lieu of waterbreaks. Seeding of roads, landings, and trails is required upon completion of operations. Fire prevention and suppression practices are addressed. Tractor logging on slopes greater than 30 percent is prohibited unless a variance is granted. Board of Forestry and Fire Control also makes rules governing skid trails, felling techniques, stump heights, slash disposal, and insect and disease protection.

State and Administrative Agency	Title of Law and Pertinent Code	Purpose and Outputs Designed to Protect	Method of Establishing Practices	Method of Administration
New Hampshire Division of Forests and Lands Department of Resources and Economic Development Water Supply and Pollution Control Commission	Act Relating to Forest Conservation and Taxation-1949 New Hampshire Revised Statutes Sections 79:3, 10-12, & 19. N.H.R.S. 224:44-a & 224:44-b (slash disposal, 1971). N.H.R.S. 149:8-a & 149:19 (pollution of waterways, 1971)	Section 79 is a timber tax law requiring reporting of forest cutting operations. Section 224 regulates cutting practices and waste disposal near highways and waters. Section 149 regulates altering the shape of the land, including by sled and log roads, to protect water quality.	Rules governing practices in all the sections are established by the state legislature in the basic act.	Owners must apply to the local assessing officials for intent to cut forms and file the form before beginning cutting. After harvest, owners must file the volume of wood cut with the assessing officials. Under section 79 Section 224 merely requires compliance with the standards in the law. Section 149 requires operators to apply to the Water Supply and Pollution Control Commission for permits before altering land near any water.
New Mexico Department of State Forestry	Act for Protection of Growing Timber-1939 New Mexico Statutes Annotated Sections 62-1-1 to -5 N.M.S.A. Sections 62-3-3 & -11 (slash disposal laws)	Protect growing timber and young growth from fire hazards and prevent logging practices that will increase fire hazards. Prevent soil erosion caused by uncontrolled water runoff. Control disposal of slash from timber operations.	Practices governing the leaving of seed trees and protection of growing timber established by the state legislature in the basic act. Rules governing slash disposal are promulgated by the Forest Conservation Commission to suppress forest and brush fires and to control forest pests. Conservation Commission composed of the Governor, Commissioner of Public Lands, and State Forester.	Administered by the Department of State Forestry. No notification or permit is required, but the standards in the law and Conservation Commission rules apply to all qualifying operations.
New York New York State Department of Conservation	New York Forest Practice Act—1946 New York Conservation Laws Annotated Sections 3-1101 to 3-1151	Provide a service to landowners, to improve cultural practices, to encourage proper harvesting of forest lands, and to prevent timber over-cutting.	Forest practice standards are made by District Forest Practice Boards consisting of three members from each county in the district. Members are appointed by the county chairman of the Board of Supervisors, and are subject to approval by the Board of Supervisors. Forest Practice Boards make rules applicable to the various forest types in their districts.	The Commissioner of the Department of Conservation authorized to establish not more than 20 forest districts. Fifteen were established, each containing one or more counties. District Board activities are coordinated by a State Forest Practice Board. When woodland owners request assistance, the District Boards send a trained forester in their employ to provide assistance in silviculture, harvesting, or regeneration. The forester writes a management plan following the standards made by the District Board.
Oregon Oregon Department of Forestry	Oregon Forest Practices Act—1971 Oregon Revised Statutes Sections 527.610 to 527.990	Recognizes that forests make a vital contribution to Oregon by providing jobs, products, and a tax base, and other social and economic benefits by helping to maintain forest tree species, soil, air, and water resources and by providing habitat for wildlife and aquatic life. The act intends to encourage forest practices that will maintain and enhance such benefits. It intends to achieve coordination among all state agencies concerned with the forest and consolidate all forestry regulations into one act. It intends to insure the continuous growing and harvesting of forest tree species to protect the soil, air, and water resources.	State Board of Forestry has the authority to develop and enforce regional rules. The board establishes forest practices regions and a nine member forest practices committee for each region. Committee members are appointed by the board for three year terms. A Department of Forestry staff member serves as a non-voting secretary. The forest practices committee recommends forest practices rules appropriate for their region to the board. The board then provides the state forester with rules establishing minimum standards for forest practices in each region or subregion after consulting with other state agencies and political subdivisions. State Board of Forestry has fifteen voting members, including the dean of U.S.U. School of Forestry, six forest product users, one representative from counties, farms, range and conservation and two representatives from labor and the public at large. In addition, three advisory members from the forest source, ALN and the Oregon Forest Protective Association are included.	The board has the authority to designate operations for which notification is required. An operator, timber owner, or landowner must notify the state forester before commencing an operation. The state forester must then send a copy of the rules to the landowner, timber owner, and timber operator. The timber operator must follow the rules when performing the pertinent forest management activities. The state forester or his employees check a percentage of the operations, currently about 50 percent, to insure compliance. Actions with the most potential for damaging the environment are inspected most frequently. Landowner appeals to actions taken by the state forester may be made to the Board of Forestry.

Applicability and Exemptions

Applies to private land-owners and timber operators.

Applies to any person, firm, association, or corporation cutting sawtimber species in the state. Owners may substitute alternate plans instead of complying with the commission rules.

Act and forest practices standards apply only to land-owners who request cooperative assistance from the District Boards.

The act applies to any individual, partnership, corporation, or association, including the state or any of its political subdivisions.

Notification is required for harvesting of forest crops, road construction or reconstruction, site preparation, application of chemicals or fertilizers, clearing forest land, treatment of slashing, and pre-commercial thinning. Notification is not required for routine road maintenance, recreational uses, grazing, tree planting or direct seeding, or removing minor products.

Waiver of notification does not relieve the owner or operator of the responsibility of complying with applicable forest practices rules.

Alternate plans proposing equivalent or better practices are acceptable.

Violations and Penalties

Section 79 and 224—Failure to obey law is a misdemeanor with a fine not to exceed \$50, including failure to apply for cutting permit. Fine of \$100 if owner fails to file volume cut at harvest. Failure to report may also result in doubling of taxes. Section 149—disposal of logging wastes in a body of water can result in fines up to \$1,000 per day. Altering land near water without written permission can result in \$25,000 fines, six months in jail, or both.

Violation of section 62-1 is a misdemeanor punishable by up to \$200 fine, six months in jail, or both. Violations of slash rules made by the commission under section 62-3 are a misdemeanor punishable by a \$10 to \$100 fine, imprisonment in the county jail for 30 days, or both.

Noncompliance after signing a cooperative agreement results in discontinuing the management services of the forester. No other penalties exist, since compliance with the practices is strictly voluntary.

The state forester must serve the operator with a citation if a violation is detected. The citation must order the operator to cease violation and may order him to take corrective action. If the violation continues, the state forester may issue a stop work for all operations. If the operator does not take corrective action, the state forester, after authorization from the forestry board, may take corrective action and bill the landowner, timber owner, and operator. Costs so incurred will constitute a general lien on the real and personal property of the landowner, timber owner, and operator.

Failure to comply with the provisions of the act is a misdemeanor punishable by up to one year in jail, fines up to \$1,000, or both.

Forest Practices Rules

Slash and mill waste may not remain in any river, stream, or brook. It may not remain within 25 feet of the land of another person, or any stream, river, or brook which can float a canoe at normal level. It may not be within 50 feet of any great pond or navigable river, the nearest edge of a public highway, or within 60 feet of a railroad right-of-way, or within 100 feet of an occupied building. Slash and mill waste may not extend more than 4 feet above the ground between 50 and 150 feet of any great pond, navigable river, stream, brook, or public highway without written consent of the state forester. Equipment, supplies, or other waste cannot be disposed of in any stream, lake, or pond. Altering and near bodies of water so as to change the natural runoff patterns is prohibited without the written consent of the Water Supply and Pollution Control Commission.

Take reasonable precautions to prevent fires in harvest areas, construct fire lanes by piling and burning slash, and reserve sufficient seed trees. Areas cut for lumber products: Leave all trees under 12 inches in diameter and at least two 17-inch seed trees per acre. Cutting for ties and mine timbers: Leave all trees under 5 inches in diameter and at least four 17-inch trees per acre. Spruce type or mixed spruce and fir type areas: If an adequate stand of young growth is not present, leave uncut at least 5 percent of the young coniferous trees, many of which should be of seed-bearing size.

Commission promulgated rules to control fires and insect and disease require logging roads to be passable after harvest, be properly drained to prevent erosion, and be reseeded with grass. All slash must be scattered in piles no higher than 4 feet, snags must be felled unless occupied by wildlife, and tree tops must be trimmed to 4 inches. Logs must be skidded in a manner that minimizes erosion of the soil.

Cooperators must manage their lands according to a plan approved by the district director. They must prevent fires, eliminate grazing, rehabilitate idle lands, and enhance the value of immature forest stands through improvement practices. They must report any timber sales to the director.

On high and medium quality sites, individual tree selection is recommended. On low quality sites, diameter limit or clear cutting is recommended. Selective cutting is recommended in uneven-aged stands. High quality hardwoods under 16 inches d.b.h. and softwoods less than 12 inches will not be cut. In uneven-aged stands, cutting recommendations vary with species, age class, and stand conditions. Logging roads, skid trails, log decks, and yards must be located to minimize site, stand, and other values. Roads must be stabilized after cutting.

All regions: Chemicals must be kept and used in leak-proof containers, water quality must be protected during mixing of chemicals, waterways protected when spraying chemicals, daily records of chemical use must be kept, and chemical accidents must be reported to the state forester immediately. Slash should be minimized by maximum utilization. If necessary for regeneration, it should be scattered, windrowed, chopped, or burned. Roads should be located on stable areas, should avoid steep slopes, should minimize stream crossings, and should use buffer strips to minimize the risk of material entering streams. Road specifications, cuts and fills, road width, and culverts should control the dispersal of runoff waters to minimize turbid waters. Debris overburden should be placed to prohibit entry into water. Road maintenance should provide a stable running surface and keep all drainage systems working.

Quality of residual stocking should be protected during harvesting operations. Avoid skidding on wet or easily compacted soils or on slopes greater than 35 percent. Cable log only up hills and minimize log landings. Landings, skid trails, and fire trails should be located on stable areas above the high water mark of streams. Drainage systems must be provided for runoff water from landings, skid trails, and fire trails. Waste materials, debris, and overburden must not enter streams or lakes. Streambeds and streamside vegetation must be kept as natural as possible by avoiding skidding or cable yarding through streams. Seventy-five percent of the original shade should be left over streams. When

(continued at top of page 67)

State and Administrative Agency	Title of Law and Pertinent Code	Purpose and Outputs Designed to Protect	Method of Establishing Practices	Method of Administration
<u>Vermont</u> Vermont Board of Forests and Parks	Conservation and Management of Forest Land Law—1945 Vermont Statutes Annotated Title 10 Sections 2051-2055	Protect immature timber, obtain natural reforestation, control water runoff, provide a continuous supply of merchantable timber, preserve the tax base, lessen the hazards of forest fires, and alleviate soil erosion.	Recommended forest practices are promulgated by the Vermont Board of Forests and Parks.	The Board of Forests and Parks publishes the recommended forest practices so that landowners may follow the guidelines if they choose to do so. The guidelines are not mandatory, so compliance depends on voluntary cooperation by landowners and timber operators.
<u>Virginia</u> Virginia Division of Forestry Department of Conservation and Economic Development	Virginia Seed Tree Law—1950 Code of Virginia Annotated Sections 10-74.1 to 10-83.01	Reforest the woodlands of Virginia, improve the quality of the environment, protect watersheds and rivers, and protect the state forest businesses.	Established by state legislature in the basic act.	Administered by the state forester. No permit or notification is required, but owners must leave seed trees per the requirements of the law.
<u>Washington</u> Division of Forestry Department of Natural Resources	Washington Forest Practice Act—1974 Revised Code of Washington Annotated Sections 76.09.010 to 76.09.935 Washington Forest Practice Rules and Regulations—1976 Washington Administrative Code Sections 222-08 to 222-50	Protect, promote, foster, and encourage timber growth and require minimum reforestation. Protect forest soils, recognize the private and public interest in the profitable growing of timber, permit maximum operating freedom, avoid unnecessary duplication of forest regulation, and provide for interagency input. Achieve compliance with all applicable requirements of federal and state laws regarding nonpoint source pollution of water caused by forest practices. Intends to protect the following outputs: forest productivity, forest soils, fisheries, wildlife, water quantity and quality, air quality, recreation, and scenic beauty. Rules may not be specially promulgated to protect recreation or scenic beauty.	The act, as amended in 1975, creates an 11-member Forest Practices Board composed of the commissioner of public lands, directors of the departments of Commerce and Economic Development, Agriculture, and Ecology. An elected member of a county legislative body is a member. The remaining must be from the general public, one of whom shall own not more than 500 acres of land, and one of whom shall be an independent logging contractor. The board has the authority to promulgate rules and regulations after review and approval by the Departments of Ecology, Fish, and Game and all the counties in the state, and after holding public hearings on the rules. The board receives technical advice on the rules to adopt from the Forest Practices Advisory Committee. The advisory committee in turn receives suggested rules from regional advisory committees. It must also hold hearings to take testimony about the rules before submitting them to the board. The board also divides the waters of the state into five categories, depending on their value for human consumption, fisheries habitat, or other uses. The same forest practice may be subject to differing degrees of regulation, depending on which water class the activity is taking place near.	The law operates under a combination of standards, notifications, and permits. The board must determine which forest practices fall into one of four administrative classes. Class I actions have no direct potential for damaging a public resource, and Class II actions have less than ordinary potential for damaging a public resource. Class III actions include practices not included under Classes I, II, or IV. Class IV forest practices have potential for substantial impact on the environment and may also require a state environmental impact statement. Class I forest practices do not require notification, just compliance with the regulations. Class II practices require notification of the Department of Natural Resources. If no reply is received within five days, the operator may proceed. Class III practices require an application to the department which the department must approve or disapprove within 15 days. Class IV practices require application to the department which must be acted on within 30 days if an environmental impact statement is not required or within 60 days if one is required. Local government units may also require an environmental impact statement. The Department of Natural Resources must inspect operations before, during, and after completion to check compliance. The Department of Ecology may also inspect to insure water quality is maintained. Forest practices may also be regulated by other local government units.

Applicability and Exemptions

Compliance with the recommended practices is strictly voluntary.

Applies to all private landowners, timber owners, or timber operators. Valid where white, loblolly, shortleaf, or pond pine constitute 10 percent or more of each acre being harvested.

Applies to all private and non-federal public lands. Practices exempt from regulation include tree marking, surveying and road flagging, cutting firewood for personal use, and removal of minor forest products. Urban lands with potential for development in the next 10 years and utility rights-of-way need not be reforested.

Applies to conversion of forest land to other uses.

Alternate reforestation plans may be acceptable.

Violations and Penalties

The law carries no penalties for noncompliance.

Violation is a misdemeanor punishable by fines of \$10 for each seed tree cut, not to exceed \$80 per acre. Fines shall be used to replant the areas where harvesting took place.

The Department of Natural Resources must first have informal conferences with violators. It may then order them to stop work or take corrective action. If the operator, landowner, or timber owner does not take corrective action, the department may do so and place a lien on the forest landowner's title.

Landowners may appeal enforcement actions to a newly created Forest Practices Appeal Board. The board is composed of three members qualified by experience and training in matters pertaining to the environment, with at least one being an attorney.

Counties may also bring suit against landowners, operators, or the department to enforce the rules.

Violators may be subject to a \$500 per offense fine, with each violation being a separate offense. Failure to comply with a stop work order is a separate offense for each day of violation. Willful violation of a forest practice rule is a gross misdemeanor punishable by a fine of \$100 to \$1,000, imprisonment for one year, or both.

Forest Practices Rules

harvesting, consideration should be given to scenic areas, critical wildlife or aquatic habitat, wet areas, and wildlife escape cover.

Eastern and southwestern region only: When stocking of acceptable species is reduced below 25 percent, 100 seedlings and/or saplings must be established per acre, within six years in the eastern region and within four years in the southwestern region. Northwestern region only: When stocking reduced below 25 percent, 150 seedlings and/or saplings must be established per acre within three or five years, depending on the subregion.

Board rules recommend the minimum diameter level for harvest cuts. Clear cutting should be allowed only where 1,000 young trees 2 or more feet high per acre are present or where stand is overmature and owner will insure regeneration. Partial cutting is the generally recommended practice and should leave the following minimum number of trees per acre: Spruce-fir, leave 400 thrifty trees 3 to 8 inches d.b.h. or a proportionate number of trees over 9 inches d.b.h. Mix should vary from 15 trees over 9 inches d.b.h. up to 350 trees from 3 to 8 inches d.b.h. Northern hardwoods: leave over 300 hardwoods, 2 to 6 inches d.b.h. or 30 trees over 12 inches d.b.h. or 120 trees 6 to 11 inches d.b.h. or a mix of the sizes on the basis of four trees 11 inches d.b.h. being equal to one tree 12 inches d.b.h. or over. In intermediate weedings, about 200 of the best shaped and tallest trees should be left on each acre for crop trees.

Leave two 14-inch tulip poplar seed trees per acre after harvest. Leave eight 14-inch or greater loblolly, shortleaf, pond, or white pine trees per acre after harvest. If 14-inch or greater seed trees are not available, two trees of the next largest diameter class must be left uncut. Seed trees must be left uncut for three years.

Road location and design should minimize width, cuts and fills should be balanced and at the same slope as the sidehills, and roads must meet minimum drainage specifications. In road construction, organic debris should not be buried, fills should be compacted, soils stabilized, stream channels cleared, moisture conditions favorable, and waste disposed of properly. Active, inactive, and abandoned roads must be properly maintained. Location, drainage, and rehabilitation of rock quarries, gravel pits, borrow pits, and slash disposal areas is regulated.

Logging systems must be appropriate for the terrain and soils. Landings must be located above 50-year flood intervals and minimized in size. Harvesting practices should leave the area conducive for timber production and encourage wildlife habitat. Brush and high stumps should be left to insure streambank integrity. At least 50 percent of the summer midday stream shade must be left. Felling into or log bucking in streams is prohibited. Cable yarding must not cross streams and should only be done uphill. Tractors and wheeled skidders will not be used in streams and should be used minimally in streamside management zones or on wet or erodible soils. Slash and other logging debris must be removed from streams.

Reforestation is required for clear cuts and cuts removing more than 50 percent of the volume of a stand in any five-year period. It is not required for salvage cuts or if 300 vigorous, desirable seedlings are present per acre. Clear cuts must be replanted within three years or naturally regenerated within five years with an acceptable species. Adequate stocking requires 300 well-established, well-distributed seedlings per acre.

Chemical leakage during storage or application is prohibited. chemical mixing must occur away from all waters, and aerial applications must leave 50 feet wide buffer strips and be made parallel to bodies of water. Ground applications using power equipment should leave a 10 feet wide buffer strip to avoid entry into water. Hand applications must be applied only to specific targets. Chemical containers must be removed and disposed of properly, or cleaned and reused, or properly buried. Daily records of aerial applications must be kept. All chemical spills must be reported immediately to the Departments of Natural Resources, Agriculture, and Ecology.

APPENDIX B

LEGISLATIVE REVIEW OF ADMINISTRATIVE REGULATIONS

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FLORIDA - (Fla. Stat. Sec 11.60) Florida's Administrative Procedures Act (APA) was rewritten in 1975 and a Joint Administrative Procedures Committee was created. This committee has three specific functions: to review proposed rules as they are adopted; to maintain a continuous review of statutory authority underlying each rule and note when that authority is changed by either the legislature or the courts; to review administrative matters in general as they relate to the APA. The committee makes a legislative observation on each rule but does not have the power to suspend a rule. If an objection is made by the committee to a rule, the agency is requested to withdraw or modify it. In most cases, agencies have been found willing to respond affirmatively to legislative objections. Of the first 840 rules reviewed in 1976, 79% were found to contain some error and 6.3% of these were found to exceed statutory authority. A 1975 amendment to the APA requires an "economic impact statement" to accompany each proposed rule estimating the costs of the rule to those affected by it. The committee has a staff of 13. A constitutional amendment giving the legislature power to suspend rules was rejected in a 1976 referendum.

IDAHO - (Idaho Code Sec. 67-5217, 67-5218) All rules authorized or promulgated by any state agency are to be submitted to the legislature in regular session for reference to the appropriate standing committees. Any committee or member of the legislature may propose a concurrent resolution rejecting, amending, or modifying any rule thought to be in violation of the statutory authority or legislative intent of the statute under which the rule was made.

LOUISIANA - (LRS 49-968 et seq) The legislature in 1976 passed a law providing that all rules proposed by agencies be submitted to a specified house and senate committee simultaneously upon their filing with the Department of the State Register. The committee may then hold a public hearing and issue a report to the agency expressing approval or disapproval of the rule. Although the committee report is printed in the State Register, the agency is not bound to accept it. A 1977 bill vetoed by the governor would have given the committees the power to stop a rule from going into effect by raising objections within 15 days after it is filed with the committee. The legislature would not have been required to act, but could have overridden the committee's objection by passage of a concurrent resolution. A 1978 law provides that if a committee finds a rule unacceptable, the committee will submit a report to the Governor. The Governor has five days to disapprove the committee report; if he does not, the agency must change or modify the rule.

MAINE - (5M RSA c.308 Sec 2501 et seq) A law enacted by the 1977 session provides that agencies submit all current rules to the legislature by January 15, 1978 for review by the appropriate standing committees. These committees must hold public hearings and recommend to the legislature an expiration schedule for all rules. A committee may recommend immediate expiration of a current rule. The legislature must then pass bills to implement these expiration schedules. All new rules which go into effect after January 1, 1978 automatically expire five years after their effectiveness unless the legislature passes a bill terminating their effectiveness in less than five years.

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MARYLAND - (Md. Ann. Code 1977, Art 40 Sec 40A) The Standing Committee on Administrative, Executive, and Legislative Review (five senators, five delegates) reviews regulations as they are published in the Maryland Register. The committee has no power to suspend or veto proposed regulations, but its views are often persuasive with agencies when it raises questions about proposed regulations.

MISSOURI - (Sec 536.037, RSMo) Under a 1976 law, the legislature created the Joint Committee on Administrative Rules. The committee reviews all proposed rules published in the Missouri Register, but its review is advisory only. A proposed constitutional amendment authorizing legislative rejection of agency rules was submitted to the electorate by the legislature and was defeated in August, 1976. During the 1977 session, the legislature attached to many bills a provision that all agency rules promulgated under the respective bills expired in two years unless approved by a concurrent resolution of the legislature. An additional provision attached to many bills mandated either the expiration of the rules promulgated under the authority of the respective bills, the repeal of the promulgating power, or both, on November 30, 1981.

NEVADA - (Chap. 233B. 101 et seq NRS) Under a 1977 law, all proposed regulations are submitted to the Nevada Legislative Commission, which must review them at its next monthly meeting. If the commission objects to a regulation, it is returned to the agency, which must resubmit either the same regulation or an amended version to the commission. The regulation is forwarded to the speaker and the senate president for referral to the appropriate standing committee. The legislature can enact legislation amending the statute under which the objectionable regulation was promulgated.

NEW HAMPSHIRE - (NHRSA Sec. 541 A) In 1977, the legislature enacted a law creating a Joint Committee on Review of Agencies and Programs. The committee will have the power to sunset agencies and review their existing rules. In addition, the law provides the standing committees the power to review rules prior to their effective date and may send the rules back to the agency if the rules are not in the proper format.

NEW YORK - (NYSAL, Legislative Law, Art. 5-B, Secs. 86-88) A 1978 law formally created the Administrative Regulations Review Commission. The Commission, originally created by joint resolution in 1977, is composed of three senate and three assembly members. Agencies must file their proposed rules with the commission at least 21 days prior to effectiveness. The commission has the power to examine agency rules as to their statutory authority, their compliance with legislative intent, their impact on the economy and government operations, their impact on affected parties. In addition, the commission may hold hearings and has been granted subpoena power.

OREGON - (ORS 171.705 to 171.713) The Legislative Counsel Committee reviews all proposed rules and reports to the legislature. There is no formal procedure for further legislative action beyond this informational review. Rules are reviewed to determine whether they conform with the intent and scope of enabling legislation, have been adopted in accordance with all legal procedures, and are consistent with constitutional provisions. The committee may recommend changes in the statute authorizing the rule-making powers.

VERMONT - (3 V.S.A. 817-820) The General Assembly of Vermont in 1976 created an eight-member joint committee on administrative rules. This committee reviews any proposed rule and may recommend its amendment or withdrawal upon a finding that the proposed rule is arbitrary, beyond the authority delegated to the agency, or contrary to legislative intent. Committee recommendations are submitted to the next session of the General Assembly. Objectionable rules may be repealed by joint resolution of the General Assembly.

APPENDIX C

STATE LANDSAT APPLICATIONS AND NATURAL RESOURCE INFORMATION SYSTEMS

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THE CALIFORNIA INTEGRATED REMOTE SENSING SYSTEM

In January of 1979, the California Environmental Data Center and the National Aeronautics and Space Administration (Ames Research Center) joined forces to establish the California Integrated Remote Sensing System (CIRSS), a project designed to demonstrate the potential benefits of integrating remote sensing technologies into the data collection activities of government agencies at all levels in California. The CIRSS project, under the management and guidance of a Task Force, involves four major demonstration projects and an investigation of operational system alternatives.

The CIRSS Task Force is composed of representatives from federal, state, regional and local government agencies, the Legislature, the state universities and colleges, and the private sector; it was created to bring together these data users and suppliers to provide advisory assistance and project review. The Task Force reviews, discusses and makes recommendations concerning the various demonstration projects and studies. To further assist with project evaluation, the Task Force has established an Industry Advisory Panel to represent more fully the views of California's private sector.

CIRSS's key concept which links the demonstrations and provides an overall framework is vertical data integration, which refers to data compatibility at several levels of government between existing data bases. Several studies have been initiated to document the general technical and institutional problems that will be encountered in this process.

Four major demonstration projects dealing with critical issues are now in progress. The development and management of prime agricultural land is being investigated by the University of California at Santa Barbara, which is seeking to demonstrate a remote sensing methodology for monitoring and assessing the conversion of valuable agricultural lands. The California Department of Forestry is demonstrating the use of Landsat digital data to inventory and assess, with regular updates, the state's forest resources. NASA/Ames Research Center is working with San Bernardino County and Environmental Systems Research Institute (ESRI) to evaluate the use of Landsat data in growth management. The Landsat data will be transferred to operational data bases at the county and federal level with direct assistance from private industry. The Association of Bay Area Governments (ABAG) and NASA/Ames are exploring vertical data integration through a regional agency with an operational geobased information system. ABAG assumes all responsibility for disseminating data to all other users and assisting them in integrating the ABAG/Landsat data into their own data bases.

THE IDAHO LANDSAT APPLICATIONS PROGRAM

The State of Idaho, over the last several years, has been an active participant in an innovative, two-stage technology transfer program. The program is being conducted under the auspices of the Pacific Northwest Regional Commission (PNRC) with the assistance of the NASA Ames Research Center and the U.S. Geological Survey. The first stage, lasting three and one half years, was the PNRC Land Resource Inventory Demonstration Project. This stage afforded the opportunity to 45 state and local agencies in Idaho, Oregon and Washington to conduct test projects incorporating satellite data into surveys and inventories of various land cover types. The second stage (FY 79 - 81) is the Landsat Applications Program, which will build the region's operational capability to extract the use information gathered by Landsat.

As part of the effort to build this capacity in Idaho, a number of state agencies are involved in projects. Specific ongoing application projects to improve data for natural resource planning and management include:

- The Idaho Department of Fish and Game is inventorying and mapping the major vegetative ecosystems and physiographic features of an important big game management unit in south central Idaho. The improved information base will be used in analyzing impacts caused by potential large-scale logging operations to wildlife habitat in the area.
- The Idaho Bureau of Mines and Geology is identifying, interpreting and assessing natural geologic hazards from Landsat imagery for use in natural resource and land use planning. Much of the active faulting in Idaho has yet to be mapped and it is anticipated that this project will help to fill this existing information void.
- The Idaho Department of Water Resources (IDWR), in addition to developing the state's digital Landsat analysis, is conducting a classification of irrigated agriculture on a test site in eastern Idaho. A primary objective of the task is the development of an operational methodology of data classification that produces consistent results.
- Two training activities are being planned by the University of Idaho's College of Forestry, Wildlife and Range Sciences. An intensive five-day workshop may be conducted in and around Coeur d'Alene on vegetation/terrain analysis remote sensing during the last week of September. An advanced remote sensing course will take place during the fall semester with special emphasis given to establishing student familiarity with computer-aided classification systems, such as VICAR/IBIS.

LANDSAT APPLICATIONS IN OREGON

Landsat data analysis is a continuing activity in Oregon. Work began on the second of two three-year projects to utilize satellite remote sensing technology for natural resource planning and management in November, 1978. The Landsat Applications Program (LAP) is funded by the Pacific Northwest regional Commission (PNRC), comprised of the Governor's of Idaho, Oregon and Washington.

In the Fall of 1974, PNRC recognized the tremendous potential as well as proven capability of the Landsat system as a tool to be used in resource planning and management. At that time, the Governors funded a program from 1975 to 1978 called the Land Resources Inventory Demonstration Project (LRIPD). Valuable support was also provided to the LRIPD, as well as the LAP, by the USGS EROS and Geography Programs and the NASA Ames Research Center. The overall goal of the LRIPD was to provide accurate and current natural resource and land cover information upon which to base planning activities and management decisions in the Pacific Northwest. A primary objective of this project was to provide an opportunity to a variety of resource planning and management agencies in Idaho, Oregon and Washington to extract, use, and evaluate information derived from satellite multispectral data and other remote sensing sources.

Single and multi-agency demonstration projects were funded in a variety of disciplines and dispersed throughout the three-state region. In Oregon, eight separate projects have been undertaken in such fields as forestry, agriculture, wildlife habitat, water resources, urban and rural land cover, surface mining, and noxious weeds. Because of the success of the three-year LRIPD, the Regional Commission agreed to support the current Landsat Applications Program.

The Oregon Water Resources Department will analyze 15 of Oregon's 18 drainage basins for land use activity, compute acreage statistics for each land use and prepare interpretation aids for subsequent updating. The land use categories include irrigated and non-irrigated agricultural land, forest land, range land, urban land, water bodies and special areas (barren land, lava flows and wetlands). The data acquired will be used by the Oregon Water Policy Review Board in maintaining policies on water use. Since irrigation is the greatest single use of water, the location and amount of irrigated and potentially irrigable land is an important data base.

Crook County Planning Department cooperatively with the U.S. Forest Service, Ochoco National Forest, Bureau of Land Management, Princeville District and Oregon State University Extension Service have proposed a resource inventory of vegetation/land use for Crook County and the Ochoco-Crooked River Planning Unit of the Ochoco National Forest which lies outside Crook County. Products of the joint analysis endeavor include a mapped and statistical inventory of vegetation/land use which meet the requirements of the Statewide Planning Goals and Guidelines and can be updated at suitable intervals in the future. Some 21 classes of agriculture, forestry and rangeland resources including water, alkaline soils and exposed rock or barren soils will be sought.

The Oregon Department of Fish and Wildlife is planning to map habitats for the Bridge Creek and South Fork Walla Walla elk herds in the Blue Mountains of northeastern Oregon. They will analyze digital Landsat data, deriving vegetation composition as well as structure in the Winter and Summer ranges and migration routes for an area of about 100,000 acres. Research findings will then be incorporated into elk herd management programs. With accurate knowledge of habitats, ODFW can determine impacts of climatic extremes, forest harvest practices and volume of hunting permits on elk population.

VERMONT'S FOREST RESOURCE ASSESSMENT PROGRAM

The Vermont General Assembly enacted the Vermont Forest Resource Assessment and Development Act (#298) in 1978, which directs the Department of Forests, Parks and Recreation to carry out a detailed assessment of the forest resources to serve as a basis for program planning and administration. This objective is being accomplished through a series of reports, maps, and tables, and by the implementation of a geographical information system. This system will be available to anyone interested in Vermont's forest resource and its future.

A basic requirement of the inventory procedure was the development of a forest and land cover type map for the State of Vermont. Accurate information on land cover classifications and areas involved will provide a basis for estimating various present and potential resources. Especially noteworthy about this Vermont program is that the assessment is being directed at critical issues concerning the management of forests for wildlife, water quality, energy, timber, environmental impacts and other public purposes. Some of these resource assessments include:

- Biomass yield: Biomass yield tables can be developed which include previously unused and unmeasured portions of the tree that can be used for firewood. Total biomass volumes for the state can then be determined.
- Forest Growth: By using currently available inventory data and applying appropriate growth simulations, growth and potential can be estimated, as well as productivity by species and forest type.
- Wildlife Habitat: Various forest types offer food, shelter and nesting sites to wildlife; these habitat types can be identified and mapped to show the extent and quality of wildlife habitat in Vermont.
- Water Quality: The impact of forest management practices on water quality can be measured, along with periodic re-classification of water bodies.
- Harvesting Impacts: The environmental consequences of large-scale mechanized harvesting of wood can be studied; and acreage and timber volume to be removed can be estimated using existing removal inventories.

Land Cover Classification from Landsat Imagery. Aerial photography has proven quite successful for inventorying forest tree species and types, especially with the increased use of color infrared film. However, the hundreds of photos needed and the interpretation effort involved to classify an entire state would be a gargantuan project, even for as small a state as Vermont. Land use classification on small-scale Landsat imagery is possible through the application of automated image processing techniques, using color infrared photos as a source of information about ground cover. The entire State of Vermont is covered by two or three Landsat images. The limitations of resolution due to scale can actually be an asset in eliminating unnecessary land cover detail.

The statewide classification map is being developed by Vermont personnel with assistance from the Goddard Space Flight Center in Greenbelt, Maryland. The team working on the map consists of staff from the Vermont Department of Forests, Parks and Recreation, the University of Vermont, Forestry Department, and the Vermont Department of Water Resources, with help from the Eastern Regional Remote Sensing Applications Center at NASA/Goddard.

The gross classification categories being attempted for this statewide map are water, urban and paved, hardwoods, conifers, mixed forest, and tilled and untilled agricultural lands.

During preliminary studies, the group experimented with two methods of computer-assisted classification: unsupervised and supervised. After verifying classification accuracies, the team determined that neither method by itself yielded an acceptable product for Vermont. Instead, a combination of the best results of both procedures, including additional samples from problem areas, was used to yield a more accurate classification product. The final statistics have now been derived and the Goddard staff will produce the classification map on color transparencies for reproduction, along with a tabular summary of area acreages by class.

Future Potentials of Landsat Imagery for Vermont. The statewide classification will be used for those aspects of the forest assessment which apply to the state as a whole, and which do not require further detail. The statewide map will also be used as the basis for a more detailed classification on the county level -- and for some selected towns. Including other parameters (in addition to the Landsat multi-spectral data) will be made simpler by acquiring a geographic data base system.

The Landsat imagery should be capable of continuously monitoring changes in the forest resources of Vermont. As the Forest Assessment Act states, the opportunity to "develop and maintain an effective system for the collection, analysis, and display of (forest resource) data" will give the people of Vermont the information base they need to "maximize the returns and benefits to Vermonters to be derived from the State's forest resource".

At the time of this report, draft final reports for the Vermont Forest Inventory Project, Watershed and Lake Inventory Project and Tent Caterpillar Project have been prepared. Vermont now has an operational Landsat program.

VIRGINIA RESOURCE INFORMATION SYSTEM

In response to a legislative initiative, a task force was formed to conduct the studies, evaluate the findings and assist in the development of recommendations for a Virginia Resource Information System (VARIS).

The studies conducted by the task force indicated needs for accurate and up-to-date information on:

- Water resource availability, quality and use in localities, river basins and the state as a whole.
- Atmospheric conditions including air quality, climatic conditions, flooding, droughts, soil conditions and other factors affecting human health.
- Land resources including soil capability for crop and forest production, highway and building support and other development purposes.
- Farm, forest, wildlife and marine life production trends and future potentials.
- Man-made resources.
- Demographic and socioeconomic factors relating to the use and management of resources.

The Executive Branch needed timely, up-to-date and accurate information on Virginia's resources in order to make effective policy decisions and amend laws affecting overall needs of the Commonwealth. Through these efforts it was recommended that the General Assembly authorize development of a comprehensive Virginia Resource Information System (VARIS) with the office of Commerce and Resources. The VARIS will be initiated concurrent with the 1980-82 fiscal biennium to concentrate on developing programs, plans and procedures for initiating and controlling comprehensive services. The VARIS'

hardware and support materials will be expanded during the 1982-84 fiscal biennium for broad-based geographic information and environmental monitoring systems. By 1986, the VARIS will be fully developed to provide up-to-date resource information that will serve statewide, regional and local needs.

WASHINGTON STATE'S APPROACH TO THE LANDSAT APPLICATION PROGRAM

In September 1978, Pacific Northwest Regional Commission (PNRC) grants were made to seven Washington state agencies and universities under the new PNRC Landsat Application Program (LAP). These grants support both the continuing development of state agency capability to use Landsat derived data for natural resource management and the implementation of analysis software to support state and local agencies at Washington State University.

Each Washington grant participant was required under the guidelines to match the funds received from the PNRC. The following agencies received grants in support of the briefly described activities:

- The City of Tacoma - received a grant to complete the installation of data management software in the City's computer.
- The Department of Natural Resources - was funded to undertake the continuing development of Landsat for potential inventory applications within the Department. The Department is involved in four projects, including analysis of timber harvesting activities in conjunction with the Department of Revenue.
- The Department of Game's Mount Vernon Office - will be undertaking a Ruffed Grouse Habitat Inventory in Western Washington.
- Spokane County Planning Department - received a grant to support continuing development of a countywide land cover analysis and to establish a countywide data management system based upon the new software capability at Washington State University.

The Washington Computer Center was funded to participate in one or more demonstration projects. This demonstration activity would also provide staff at the Center with practical experience applicable throughout the state. A state-wide workshop will be held next spring.

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